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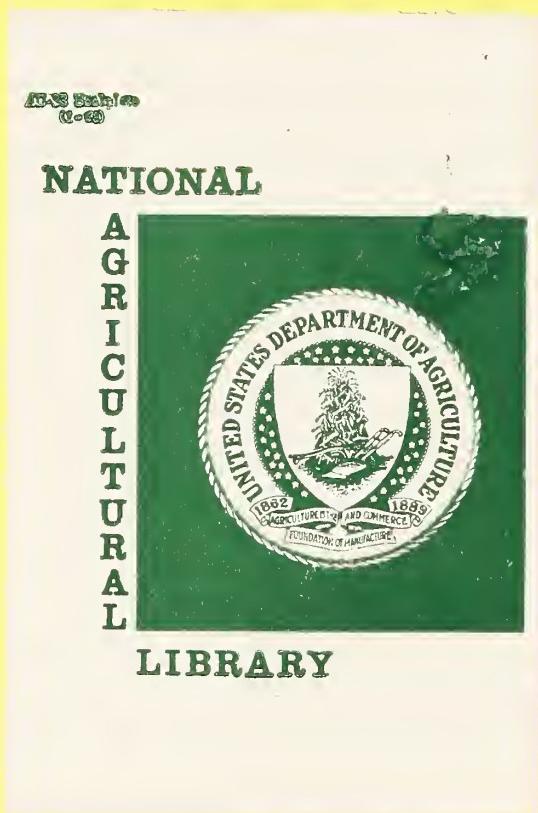
**PLAN and  
ENVIRONMENTAL IMPACT STATEMENT  
for**

**WATERSHED PROTECTION  
FLOOD PREVENTION  
and  
RECREATION**

***MIDDLE WALNUT WATERSHED***

**BUTLER, COWLEY, SEDGWICK and  
SUMNER COUNTIES, KANSAS**

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**PLAN AND ENVIRONMENTAL IMPACT STATEMENT**

**Middle Walnut Watershed**

**Butler, Cowley, Sedgwick, and Sumner Counties, Kansas**

**Prepared Under the Authority of the  
Watershed Protection and Flood Prevention Act  
(Public Law 566, 83d Congress; 68 Stat. 666) as amended  
and in accordance with the  
National Environmental Policy Act of 1969,  
Section 102 (2) (C) Public Law 91-190**

**Prepared by**

Middle Walnut Watershed Joint District No. 60  
Butler County Conservation District  
Cowley County Conservation District  
Sedgwick County Conservation District  
Sumner County Conservation District  
City of Udall

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**Soil Conservation Service  
Forest Service**

**State of Kansas**

**State Conservation Commission  
Office of the Kansas State Extension Forester  
Kansas Forestry, Fish and Game Commission**

**February 1976**



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WATERSHED PLAN AGREEMENT

between the

MIDDLE WALNUT WATERSHED JOINT DISTRICT NO. 60  
Local Organization

BUTLER COUNTY CONSERVATION DISTRICT  
Local Organization

COWLEY COUNTY CONSERVATION DISTRICT  
Local Organization

SEDGWICK COUNTY CONSERVATION DISTRICT  
Local Organization

SUMNER COUNTY CONSERVATION DISTRICT  
Local Organization

CITY OF UDALL  
Local Organization

(hereinafter referred to as the  
Sponsoring Local Organizations)

State of Kansas

and the

Soil Conservation Service  
United States Department of Agriculture

(hereinafter referred to as the Service)

Whereas, application has heretofore been made to the Secretary of Agriculture by the Sponsoring Local Organizations for assistance in preparing a plan for works of improvement for the MIDDLE WALNUT WATERSHED, State of Kansas, under the authority of the Watershed Protection and Flood Prevention Act (Public Law 566, 83d Congress, 68 Stat. 666), as amended; and

Whereas, the responsibility for administration of the Watershed Protection and Flood Prevention Act, as amended has been assigned by the Secretary of Agriculture to the Service; and

Whereas, there has been developed through the cooperative efforts of the Sponsoring Local Organizations and the Service a mutually satisfactory plan for works of improvement for the MIDDLE WALNUT WATERSHED, State of Kansas, hereinafter referred to as the watershed plan, which plan is annexed to and made a part of this agreement;

Now, therefore, in view of the foregoing considerations, the Sponsoring Local Organizations and the Secretary of Agriculture, through the Service, hereby agree on the watershed plan and further agree that the works of improvement as set forth in said plan can be installed in about seven (7) years.

It is mutually agreed that in installing and operating and maintaining the works of improvement substantially in accordance with the terms, conditions, and stipulations provided for in the watershed plan:

1. The Sponsoring Local Organizations will acquire such land rights as will be needed in connection with the works of improvement. The percentages of this cost to be borne by the Sponsoring Local Organizations and the Service are as follows:

| <u>Works of Improvement</u>   | Sponsoring Local Organizations<br>(Percent) | Service<br>(Percent) | Estimated Land Rights Cost<br>(Dollars) |
|---|---|----------------------|---|
| 14 Floodwater Retarding Structures  | 100   | 0                    | 359,900                                 |
| Multipurpose Structure No. 4 (Floodwater retarding and recreational water supply) |   |                      |   |
| Payment to landowners for about 332 acres   | 50  | 50                   | 252,000                                 |
| Legal fees, survey costs, flowage easements, and other                            | 100   | 0                    | 3,700                                   |

The Sponsoring Local Organizations agree that all land acquired or improved with P. L. 566 financial or credit assistance will not be sold or otherwise disposed of for the evaluated life of the project except to a public agency which will continue to maintain and operate the development in accordance with the Operation and Maintenance Agreement.

2. The Sponsoring Local Organizations assure that comparable replacement dwellings will be available for individuals and persons displaced from dwellings, and will provide relocation assistance advisory services and relocation assistance, make the relocation payments to displaced persons, and otherwise comply with the real property acquisition policies contained in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the Regulations issued by the Secretary of Agriculture pursuant thereto. The costs of relocation payments will be shared by the Sponsoring Local Organizations and the Service as follows:

|                     | Sponsoring<br>Local<br><u>Organizations</u><br>(Percent) | Service<br>(Percent) | Estimated<br>Relocation<br><u>Payment Costs</u><br>(Dollars) |
|---------------------|--|----------------------|--|
| Relocation Payments | 61.0   | 39.0                 | 12,500   |

3. The Sponsoring Local Organizations will acquire or provide assurance that landowners or water users have acquired such water rights pursuant to state law as may be needed in the installation and operation of the works of improvement.
4. The percentages of construction costs of structural measures to be paid by the Sponsoring Local Organizations and by the Service are as follows:

| <u>Works of Improvement</u>   | Sponsoring Local Organizations<br>(Percent) | Service<br>(Percent) | Estimated Construction Cost<br>(Dollars) |
|---|---|----------------------|--|
| 14 Floodwater Retarding Structures  | 0   | 100                  | 1,572,600                                |
| Multipurpose Structure No. 4 (Floodwater retarding and recreation water supply) | 27.3  | 72.7                 | 180,300                                  |
| Recreational Facilities   | 50  | 50                   | 134,800                                  |

5. The percentages of the engineering costs to be borne by the Sponsoring Local Organizations and the Service are as follows:

| <u>Works of Improvement</u>   | Sponsoring Local Organizations<br>(Percent) | Service<br>(Percent) | Estimated Engineering Cost<br>(Dollars) |
|---|---|----------------------|---|
| 14 Floodwater Retarding Structures  | 0   | 100                  | 251,400                                 |
| Multipurpose Structure No. 4 (Floodwater retarding and recreation water supply) | 0   | 100                  | 28,800                                  |
| Recreational Facilities   | 50  | 50                   | 12,800 <sup>1/</sup>                    |

1/ For engineering contract costs

6. The Sponsoring Local Organizations and the Service will each bear the costs of the Project Administration which it incurs, estimated to be \$8,500 and \$690,700 respectively.
7. The Sponsoring Local Organizations will obtain agreements from owners of not less than 50 percent of the land above each reservoir and floodwater retarding structure that they will carry out conservation farm or ranch plans on their land.

8. The Sponsoring Local Organizations will provide assistance to landowners and operators to assure the installation of the land treatment measures shown in the watershed plan.
9. The Sponsoring Local Organizations will encourage landowners and operators to operate and maintain the land treatment measures for the protection and improvement of the watershed.
10. The Sponsoring Local Organizations will be responsible for the operation and maintenance of the structural works of improvement by actually performing the work or arranging for work in accordance with agreements to be entered into prior to issuing invitations to bid for construction work.
11. The costs shown in this agreement represent preliminary estimates. In finally determining the costs to be borne by the parties hereto, the actual costs incurred in the installation of works of improvement will be used.
12. This agreement is not a fund obligating document. Financial and other assistance to be furnished by the Service in carrying out the watershed plan is contingent on the appropriation of funds for this purpose.

A separate agreement will be entered into between the Service and the Sponsoring Local Organizations before either party initiates work involving funds of the other party. Such agreement will set forth in detail the financial and working arrangements and other conditions that are applicable to the specific works of improvement.
13. The watershed plan may be amended or revised, and this agreement may be modified or terminated only by mutual agreement of the parties hereto except for cause. The Service may terminate financial and other assistance in whole, or in part, at any time whenever it is determined that the Sponsoring Local Organizations have failed to comply with the conditions of this agreement. The Service shall promptly notify

the Sponsoring Local Organizations in writing of the determination and the reasons for the termination, together with the effective date. Payments made to the Sponsoring Local Organizations or recoveries by the Service under projects terminated for cause shall be in accord with the legal rights and liabilities of the parties.

14. No member of or delegate to Congress, or resident commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise therefrom; but this provision shall not be construed to extend to this agreement if made with a corporation for its general benefit.
15. The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964, as amended, and the Regulations of the Secretary of Agriculture (7 C.F.R. 15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any activity receiving federal financial assistance.
16. This agreement will not become effective until the Service has issued a notification of approval and authorizes assistance.

BUTLER COUNTY CONSERVATION  
DISTRICT

Local Organization

137 Old Hill Rd El Dorado Ks

Address

Zip Code

67042

Walter Woods  
By For: John Templeton

John Templeton  
Title Chairman

Date 4-17-76

The signing of this agreement was authorized by a resolution of  
the governing body of the BUTLER COUNTY CONSERVATION DISTRICT  
Local Organization

adopted at a meeting held on 12-9-75

Don Showalter  
Secretary, Local Organization

Don Showalter

Date 4-17-76

El Dorado Ks 67042  
Address Zip Code

COWLEY COUNTY CONSERVATION  
DISTRICT

Local Organization

170 W 12

Kinfield Ks

Address

Zip Code

By Joe Warren  
Joe Warren

Title Chairman

Date April 17-76

The signing of this agreement was authorized by a resolution of  
the governing body of the COWLEY COUNTY CONSERVATION DISTRICT  
Local Organization

adopted at a meeting held on 3-16-76

Floyd Thiel  
Secretary, Local Organization

Floyd Thiel

Date 4-16-76

170 W 12  
Kinfield Ks 67156  
Address Zip Code

SEDWICK COUNTY CONSERVATION DISTRICT

Local Organization 4100 Maple  
Wichita KS 67209  
 Address Zip Code

By Lynn H. Buerki

Lynn H. Buerki  
 Title Chairman

Date April 16, 1976

The signing of this agreement was authorized by a resolution of the governing body of the SEDWICK COUNTY CONSERVATION DISTRICT Local Organization

adopted at a meeting held on

Mary Alice Horsch

Secretary, Local Organization  
 Mary Alice Horsch

Date April 16, 1976

March 5, 1976

4100 Maple  
Wichita KS 67209

Address Zip Code

SUMNER COUNTY CONSERVATION DISTRICT

Local Organization Room 106 Federal Bldg.  
Wellington KS. 67152  
 Address Zip Code

By Rinaldo Lawless

Rinaldo Lawless  
 Title Chairman

Date 4-16-1976

The signing of this agreement was authorized by a resolution of the governing body of the SUMNER COUNTY CONSERVATION DISTRICT Local Organization

adopted at a meeting held on

Charles Pettigrew  
 Secretary, Local Organization  
 Charles Pettigrew

Date 4-16-76

April 2-1976

Room 106 Federal Bldg.  
Wellington KS. 67152

Address Zip Code

CITY OF UDALL

Local Organization

Udall, Kansas  
110 S. Main 67146  
 Address Zip Code

By Gary L. Tiller  
 Gary L. Tiller  
 Title Mayor  
 Date 4/16/76

The signing of this agreement was authorized by a resolution of  
 the governing body of the CITY OF UDALL  
 Local Organization

adopted at a meeting held on  
April 6, 1976  
Jelly Jo Thompson  
Roxie L. Sweet  
 Clerk, Local Organization

Roxie L. Sweet

Date April 16, 1976

Udall, Kansas 67146  
 Address Zip Code

MIDDLE WALNUT WATERSHED JOINT  
DISTRICT NO. 60

Local Organization

139 Oil Hill Road 67042  
 Address Zip Code

By E. E. Jabs  
 E. E. Jabs

Title President

Date 4-17-1976

The signing of this agreement was authorized by a resolution of  
 the governing body of the

MIDDLE WALNUT WATERSHED JOINT DISTRICT NO. 60  
 Local Organization

adopted at a meeting held on

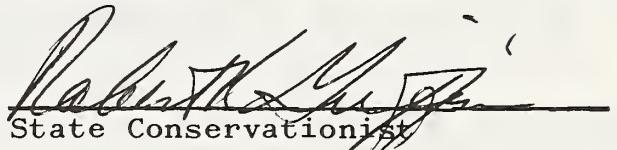
Clee Ralston  
 Secretary, Local Organization  
 Clee Ralston  
April 17, 1976  
 Date

March 10, 1976  
139 Oil Hill Road 67042  
 Address Zip Code

Appropriate and careful consideration has been given to the environmental impact statement prepared for this project and to the environmental aspects thereof.

Soil Conservation Service  
United States Department of Agriculture

Approved by:

  
\_\_\_\_\_  
State Conservationist  
Robert K. Griffin  
  
\_\_\_\_\_  
Date 4/19/76

SUMMARY OF PLAN

Middle Walnut Watershed has an area of 188,947 acres or 295 square miles. The watershed comprises approximately 60 river miles of the Walnut River from Augusta to Winfield. It includes the tributaries of Four Mile, Eight Mile, Polecat, Stewart, Crooked, Spring, Sanford, Little Dutch, Foos, and Lone Elm Creeks (see Project Map).

This plan for watershed protection, flood prevention, and recreation is sponsored by the Butler, Cowley, Sedgwick, and Sumner County Conservation Districts, the City of Udall, and Middle Walnut Watershed Joint District No. 60. Technical assistance in preparing the watershed plan was provided by the Soil Conservation Service, United States Department of Agriculture. The State Conservation Commission negotiated contracts for engineering services with the consulting engineering firms of Cook, Flatt, and Strobel, Topeka, Kansas, and R. S. Delamater and Associates, Wichita, Kansas. Engineering contract funds have been provided by the State of Kansas and the watershed district. The forestry plan for the watershed was prepared by the Kansas State and Extension Forester and the Forest Service, U.S.D.A. and this plan reflects the findings of that report. A letter report covering fish and wildlife habitat conditions with recommended plans for habitat replacement and improvement was supplied by the U. S. Fish and Wildlife Service, U.S.D.I., and was concurred in by the Kansas Forestry, Fish and Game Commission.

Watershed problems consist primarily of upland erosion and floodwater damage to crops, land, other agricultural and urban property, roads, and bridges. Average annual flood damages in the watershed under future without project conditions, excluding the main stem of the Walnut River, are estimated to be \$193,400. Additional water is needed to meet the demands for recreation.

Works of improvement are planned to solve major water and land resource problems of the watershed. Adequate land treatment will be achieved on 33,622 acres of cropland, 10,196 acres of rangeland, 850 acres of forestland, and fire control on 52,591 acres.

Woodland treatment is planned for 850 acres. Measures to be applied include tree planting, timber stand improvement, grazing control, windbreak renovation, and proper timber

harvesting. Fire protection will continue to be provided through cooperative agreements with rural fire districts on the 52,591 acres of forest and grasslands.

Structural measures will consist of 14 floodwater retarding structures and 1 multipurpose structure for recreational water supply and flood prevention storage with recreational facilities. The structures will have an aggregate capacity of 13,047 acre feet of which 2,193 acre feet are for sediment storage, 10,466 acre feet for floodwater detention storage, and 388 acre feet for recreational water supply. The Middle Walnut Watershed District and the City of Udall are jointly sponsoring recreational water supply and recreational facilities connected with Structure No. 4.

Installation of project measures will result in a reduction in depth of flooding, the extent of flooding, velocity of the water, and the sediment load transported. Structural measures will regulate runoff from a drainage area of 48.4 square miles. The percent of drainage area controlled on each major tributary is: Crooked Creek, 48.5 percent; Stewart Creek, 52.7 percent; and Eight Mile Creek, 39.9 percent. Protection on Four Mile Creek will be provided through land treatment measures and land use regulation. Works of improvement will reduce flood damage 59 percent on 8,636 acres of tributary agricultural flood plain land. In addition, 19,402 acres on-project and 11,134 acres off-project will be benefited on the main stem of the Walnut River. Structural measures will reduce flooding on 6,272 acres of tributary flood plain, 7,094 acres of on-project Walnut River flood plain and 11,134 acres of off-project Walnut River flood plain.

Development of multipurpose Structure No. 4 and the associated recreational facilities will require conversion of 332 acres from private to public ownership.

The upper reaches of the watershed are influenced by the Wichita metropolitan area. A total of 5,965 rural and 31,531 urban residents will benefit from the watershed protection and flood damage reduction afforded by this plan. Benefits will accrue to many others living in surrounding areas.

Evaluated average annual benefits from structural measures are \$323,900. The benefit-cost ratio for structural measures is 1.4:1. Individual benefit items are shown on Tables 5 and 6.

A period of seven years is proposed for installing the works of improvement in this plan.

The estimated cost of installing the project is \$7,647,500. Public Law 566 costs are \$2,985,900 of which \$106,700 are for technical assistance to accelerate establishment of land treatment measures and \$2,879,200 are for installing structural measures. Structural measure costs paid by local interests are valued at \$628,800. Land treatment amounting to \$4,032,800 will be established with other funds during the installation period.

Middle Walnut Watershed District will acquire land rights and contract for construction of the 14 floodwater retarding structures, multipurpose Structure No. 4, and recreational facilities. The watershed district will operate and maintain the 14 floodwater retarding structures and the multipurpose structure. Udall will operate, maintain, and replace recreational facilities. Annual operation, maintenance, and replacement costs of recreational facilities are estimated to be \$18,700. Land treatment measures will be maintained by land owners and operators of the farms on which the measures are installed. This will be accomplished by agreement with local conservation districts.

#### INTRODUCTION

Information pertinent to the plan and also required for the environmental impact statement has been deleted from Part I to avoid excessive duplication. Part II should be reviewed for additional information on watershed resources, environmental setting, project formulation, planned project, water and related land resource problems, effects of works of improvement, and projects or plans of other agencies.

#### PLANNED MEASURES

Adequate land treatment will be achieved on 33,622 acres of cropland, 10,196 acres of rangeland, 850 acres of forestland, and 52,591 acres of additional fire control. Farmers cooperating with conservation districts will develop conservation plans that provide for an orderly process of applying conservation treatment.

A system of 14 floodwater retarding structures and 1 multipurpose floodwater retarding recreation structure with recreational facilities are included as planned project structural measures. Measures will be installed through cooperation of the project sponsors and the Soil Conservation Service. For details see Table 3 of Part I and Planned Project section and Project Map (Appendix E) of Part II.

INSTALLATION COSTS - MONETARY

Needed land treatment measures and their estimated costs are shown in Table 1. The estimated total planning and installation cost for land treatment is \$4,139,500. P. L. 566 funds will provide \$106,700 for technical assistance to accelerate the going program. Other sources will provide the remaining \$4,032,800 for installing these measures. All land treatment cost estimates are based on present costs of applying these measures under the going program.

Structural measures and their estimated costs are also shown in Table 1. These costs are separated by individual structures in Table 2. The total estimated cost for all structural measures is \$3,508,000. The following discussion of the structural measures costs will deal first with the major elements listed in Table 1 (construction, engineering services, relocation payments, project administration, and land rights.) Following will be an explanation of the estimated structural cost distributions found in Table 2.

Construction cost estimates are based on topographic survey data and unit costs of similar work on other projects. A contingency allowance of 12 percent was used; however, unusual construction problems are not anticipated. Part of the wildlife mitigation costs and the costs for plugging abandoned oil wells are included as construction costs.

Engineering services include all direct and related costs of surveys, geologic site investigations, soil mechanics, structure design, construction plans and specifications.

Relocation payments are made to those landowners and farm operators who are displaced from their farm operations. These costs include moving and expenses of searching for a replacement farm location or payments for direct losses of personal property if the farm operation is not relocated. The estimated total relocation payments associated with Structure No. 4 are \$12,500. Public Law 566 funds will pay 39.0 percent or \$4,900 and the watershed district will pay 61.0 percent or \$7,600. Cost-sharing percentages are based on the ratio of P.L.566 funds and other funds to the total project costs, not including relocation payments.

Project administration costs are P.L. 566 and other administrative costs associated with installation of structural measures. These costs include contract administration, review of engineering plans prepared by others, and necessary inspection service during construction to insure that structural measures are installed in accordance with plans and specifications.

The watershed district will provide relocation assistance advisory services without P.L. 566 cost-sharing at an estimated cost of \$500. These services shall provide (1) all measures or facilities necessary to determine relocation assistance needs, (2) information regarding replacement property, (3) informational brochures, (4) assurance of replacement dwellings, and (5) assistance in getting established.

In addition to relocation assistance advisory services, the sponsors and the Service will be involved in administrative functions in connection with relocation payments. The sponsors and the Service will each bear the costs they incur. These shall include costs for: (1) serving notice of displacement, (2) providing application forms, (3) assisting in filing applications, (4) hearing and resolving grievances, and (5) making relocation payments. The Service will assist the sponsors in carrying out these administrative functions.

All land values were determined by the Middle Walnut Watershed District board of directors and agreed to by the Soil Conservation Service. Land rights cost estimates were based on current land values and vary from \$200/acre for upland grassland and \$600/acre for flood plain cropland to \$1,500/acre for land in the northeast section of the watershed near the city of Wichita. Land rights cost estimates also include appraisal fees. Land rights cost estimates may not coincide with actual out-of-pocket costs to the local sponsoring organizations because some easements may be obtained through donation. Cost estimates for land to be taken in fee title for Structure No. 4 are based on \$760/acre. Some additional local costs are required in modifying roads and utilities. Land rights involving the installation of wildlife habitat mitigation measures will be obtained by the sponsors.

Construction and engineering costs for multipurpose Structure No. 4, excluding recreational facilities, will be allocated on the basis of the "separable cost remaining benefit" method. Allocations computed in this manner are: flood prevention, 45.4 percent, and public recreation, 54.6 percent. Construction costs will be shared as follows:

| <u>Item</u>          | Sponsoring<br>Local<br><u>Organizations</u> |             | <u>P.L. 566</u> |             | <u>Total</u> |             |
|----------------------|---|-------------|-----------------|-------------|--------------|-------------|
|                      | <u>%</u>                                    | <u>Cost</u> | <u>%</u>        | <u>Cost</u> | <u>%</u>     | <u>Cost</u> |
| Public<br>Recreation | 50.0  | 49,300      | 50.0            | 49,200      | 100.0        | 98,500      |
| Flood<br>Prevention  |   |             | 100.0           | 81,800      | 100.0        | 81,800      |
| Total                | 27.3  | 49,300      | 72.7            | 131,000     | 100.0        | 180,300     |

Engineering costs for Structure No. 4, excluding recreational facilities, are estimated at \$28,800. This cost will be paid by P.L. 566.

Land rights for both the reservoir and recreational facilities are to be acquired on 332 acres at an estimated cost of \$255,700. This cost will be shared as follows:

| <u>Item</u>                    | Sponsoring<br>Local<br><u>Organizations</u> |             | <u>P.L. 566</u> |             | <u>Total</u> |             |
|--------------------------------|---|-------------|-----------------|-------------|--------------|-------------|
|                                | <u>%</u>                                    | <u>Cost</u> | <u>%</u>        | <u>Cost</u> | <u>%</u>     | <u>Cost</u> |
| Dam & Reservoir                |   |             |                 |             |              |             |
| Fee Title                      |   |             |                 |             |              |             |
| 245 acres                      | 50.0  | 93,000      | 50.0            | 93,000      | 100.0        | 186,000     |
| Recreational Area              |   |             |                 |             |              |             |
| 87 acres                       | 50.0  | 33,000      | 50.0            | 33,000      | 100.0        | 66,000      |
| Surveys, Legal<br>Fees, etc.   |   |             |                 |             |              |             |
| (Includes easements on 10 ac.) | 100.0                                       | 3,700       |                 |             | 100.0        | 3,700       |
| Total                          | 50.7  | 129,700     | 49.3            | 126,000     | 100.0        | 255,700     |

Construction and engineering costs for the recreational facilities amount to \$147,600. Costs for construction and contracted A&E services for recreational facilities will be shared 50 percent by P.L. 566 and 50 percent by the sponsoring local organizations.

Public Law 566 costs for the 14 floodwater retarding structures include all of the construction and engineering services and part of the project administration costs.

The total project administration cost is estimated to be \$699,200. Public Law 566 will bear \$690,700 of this cost and other funds will pay the remaining \$8,500. The Service and sponsors will each pay their own cost as it occurs.

The total estimated installation cost for the 14 floodwater retarding structures, the multipurpose structure and the recreational facilities (excluding project administration) is \$2,808,800. This cost in relation to purpose and cost sharing is shown in Table 2A.

Estimated P.L. 566 costs and other obligations by fiscal years during the project installation period are as follows:

| <u>Fiscal Year</u> | <u>Land Treatment</u> |                    |                |
|--------------------|-----------------------|--------------------|----------------|
|                    | <u>P.L. 566 Costs</u> | <u>Other Costs</u> | <u>Total</u>   |
| First              | \$ 15,300             | \$ 580,800         | \$ 596,100     |
| Second             | 20,300                | 761,500            | 781,800        |
| Third              | 25,300                | 980,800            | 1,006,100      |
| Fourth             | 15,200                | 580,800            | 596,000        |
| Fifth              | 15,200                | 580,800            | 596,000        |
| Sixth              | 10,200                | 400,000            | 410,200        |
| Seventh            | <u>5,200</u>          | <u>148,100</u>     | <u>153,300</u> |
| Total              | \$106,700             | \$4,032,800        | \$4,139,500    |

| <u>Fiscal Year</u> | <u>Structural Measures</u> |                    |                |
|--------------------|----------------------------|--------------------|----------------|
|                    | <u>P.L. 566 Costs</u>      | <u>Other Costs</u> | <u>Total</u>   |
| First              | \$ 293,500                 | \$ 61,500          | \$ 355,000     |
| Second             | 450,900                    | 107,800            | 558,700        |
| Third              | 484,500                    | 45,800             | 530,300        |
| Fourth             | 452,800                    | 156,400            | 609,200        |
| Fifth              | 483,000                    | 38,200             | 521,200        |
| Sixth              | 329,300                    | 190,500            | 519,800        |
| Seventh            | <u>385,200</u>             | <u>28,600</u>      | <u>413,800</u> |
| Total              | \$2,879,200                | \$628,800          | \$3,508,000    |

BENEFITS - MONETARY

Evaluated average annual project benefits equal \$361,600. Of this, \$37,700 will accrue from land treatment measures and \$323,900 is attributable to structural measures. Individual items of benefit are shown in Tables 5 and 6.

Average annual flood damage reduction benefits with the project installed will total \$164,000. Benefits from reduced floodwater damage to crops and pasture will average \$68,100 annually and account for 42 percent of the total flood damage reduction benefits. Reduced flooding will achieve benefits of \$13,100 to other agricultural properties such as stored feed, fences, buildings, and other farm facilities. Annual average benefits of \$9,400 will accrue to roads and bridges. A reduction in sediment deposition on cropland and in Kaw Lake will cause damage reduction benefits of \$3,700 annually.

Benefits from reduced damage to flood plain land by scour will average \$9,800 annually and account for 6 percent of the total damage reduction benefits. Indirect average annual benefits, realized from less interruption of travel to mail deliveries, school buses, and milk routes, will amount to \$10,500.

The reduction of the flood hazard will provide annual benefits averaging \$33,100 from more intensive use of land through improved crop rotations and use of fertilizer.

Multipurpose Structure No. 4 will produce annual recreational benefits of \$112,500 from boating, fishing, sightseeing, camping, hunting, picnicking, and swimming. Incidental recreation benefits were not evaluated.

Local secondary benefits will average \$52,000 annually. Secondary benefits from a national viewpoint were not considered pertinent to the economic evaluation.

Benefits of \$36,800 will occur annually to the off-project Walnut River flood plain area. Average annual benefits of \$12,600 will occur to the on-project area of the Walnut River flood plain (see Table 5).

COMPARISON OF BENEFITS AND COSTS

Average annual cost of structural measures, including installation, operation, and maintenance, is \$233,400. When the project is completely installed, the structural measures are expected to produce average annual benefits (excluding local secondary benefits) of \$271,900. The benefit-cost ratio without the inclusion of local secondary benefits is 1.2 to 1. With local secondary benefits of \$52,000 included, the project will produce benefits of \$1.40 for each dollar of cost.

INSTALLATION PROVISIONS

The works of improvement will be installed in a 7-year period following authorization of federal assistance provided under authority of the Watershed Protection and Flood Prevention Act (P.L. 566, 83d Congress; 68 Stat. 666) as amended.

The installation of general land treatment and forestry land treatment measures, including fire control, is discussed in the section "Planned Project" under "Land Treatment Measures" of Part II. The Kansas Forestry, Fish and Game Commission will provide technical assistance for the application of wildlife measures.

The Extension Service will assist local conservation districts in preparation of general information for use in the educational phase of the program. The Farmers Home Administration Soil and Water Loan Program will be available to eligible farmers in the area. The County Agricultural Stabilization and Conservation Committees will cooperate with governing bodies of the conservation districts to accelerate assistance for practices which will accomplish the conservation objectives.

After federal assistance is authorized for installation of the project, the Soil Conservation Service will furnish engineering services to prepare construction plans and specifications for all the structures.

Engineering for the recreational facilities will be provided in part by the watershed district. The Service will provide on-site planning assistance and standard designs as available. An A&E contract will be let by the Service

for the remaining engineering services connected with the recreational facilities.

Middle Walnut Watershed District will contract for the construction of all structural measures and recreational facilities. Construction contracts will be awarded on the basis of competitive bidding. There will be separate contracts for construction and for fencing, vegetative establishment, wildlife measures, and recreational facilities. The watershed district will employ a contracting officer. The Soil Conservation Service will inspect construction of all structural measures and recreational facilities.

The watershed district will obtain all land rights needed for installation of the structural measures. They have the power of eminent domain to obtain land rights for public improvements and have agreed to use such authority when needed. Land rights not donated will be secured in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. The watershed district board will make arrangements with county commissioners for abandoning, moving, or modifying any county roads requiring such action. The watershed district will also arrange for moving or modifying pipelines, communication lines, or other public utilities as needed.

Legal services involved in acquiring land rights for all structures will be furnished by local sponsors.

Middle Walnut Watershed District will be accountable for managing finances associated with installing measures involving the expenditure of P.L. 566 funds. This will require development of a financial management system to provide for the maintenance of appropriate records, reports, audits, and accounts needed to satisfy the requirements of OMB Circular A-102.

The watershed district, as a part of their project administration, will provide written notice, application forms, and advisory services to each displaced person or farm operation; assist in filing applications; review and take action on applications for relocation assistance and displacement grievances; and make relocation payments. The Service will assist the district in carrying out its responsibility.

Decent, safe, and sanitary replacement housing, if needed, will be made available prior to the construction of measures causing displacements. All displaced persons will be given at least 90 days notice to vacate.

Construction can be started when necessary land treatment has been completed, necessary land rights have been obtained, P.L. 566 funds are available, and sponsoring organizations have complied with state laws relating to approval of construction plans.

#### OPERATION AND MAINTENANCE PROVISIONS

Land treatment measures will be maintained by landowners and operators of farms on which the measures are installed through agreements with the conservation districts. Conservation district representatives will make periodic inspections of land treatment measures to encourage landowners to perform needed maintenance.

The watershed district is responsible for operation and maintenance of the land treatment detention dams. The district will enter into agreements with the landowners who will do the work.

Technical assistance to landowners and rural fire districts for operating and maintaining forestry and fire control measures beyond the installation period will be provided by the Kansas State and Extension Forester in cooperation with the Forest Service under regular, continuing programs.

Agreements providing for operation and maintenance of structural measures and recreational facilities will be executed by the local sponsoring organizations before federal construction funds are made available.

The operation and maintenance agreement will include specific provisions for retention and disposal of property acquired or improved with P.L. 566 financial assistance.

The floodwater retarding structures will be operated and maintained by the watershed district at an estimated average annual cost of \$7,100. Maintenance will be accomplished through hired or contributed labor and equipment. Funds will be obtained from an annual tax levy.

The reservoir, dam, and spillway for multipurpose Structure No. 4 will be operated and maintained by the watershed district at an estimated annual cost of \$800. Recreational facilities and associated areas will be operated, maintained, and replaced by the City of Udall at an estimated annual cost of \$18,700. Useful life will vary for recreational facilities. An average period of 20 years has been used to compute replacement costs. Funds will be obtained from user fees and an annual tax levy. User fees will not exceed those required to offset initial costs plus annual operation and maintenance expenses.

Natural streamflow is to be passed through the dams to meet downstream water rights as provided by the Kansas Water Appropriation Act. Principal spillways will include 8-inch minimum diameter drawdown pipes with control valves to permit low-flow releases regardless of reservoir storage elevation. These drawdown works will be for the purposes of complying with the Water Appropriation Act and draining sediment and beneficial pools for maintenance and repair. The Middle Walnut Watershed District will assume the responsibility for managing releases from the 14 floodwater retarding structures and multipurpose Structure No. 4. The recreational pool is normally expected to be operated between elevations 1209.8 and 1211.2. Sponsors may also make releases from the floodwater retarding structures upon request to meet downstream water needs during drought periods. The watershed district intends to make needed releases to provide downstream flow for fish and wildlife improvement.

A vegetative measure (associated with structural measures) establishment period is granted. During this period the State Conservationist may approve PL-566 cost sharing for additional work that is required to obtain adequate vegetative cover. This period is to terminate when adequate vegetative cover is obtained or 2 growing seasons have elapsed after initial installation of vegetative work, whichever occurs first. Operation and maintenance responsibility rests with the sponsors during the establishment period, as it does during the remainder of the project life.

All structural measures will be inspected annually, after unusually severe floods, and after any other unusual condition that might adversely affect their operation, maintenance, or safety. The Soil Conservation Service and local representatives responsible for operation and

maintenance will jointly make inspections for a 3-year period following completion of construction. Thereafter, annual inspections will be made by the sponsors for the life of the structures. Items of inspection will include, but not be limited to: the principal spillway and its appurtenances, emergency spillway, earth fill, vegetative cover of the earth fill and emergency spillway, fences installed as a part of the structural measures, wildlife measures, and recreational facilities. Records of inspections will be maintained by the sponsors.

Prescribed tree and shrub plantings should be maintained at a 75 percent survival rate for the first 5 years, and thereafter managed to allow desirable natural growth and reproduction during the life of the project. Mowing, haying, burning, and livestock grazing will not be permitted unless deemed desirable for wildlife purposes.

Maintenance work will be carried out when needed. Repairs on major construction items, such as dams and spillways, are expected very infrequently. Fences, water and sewer systems, picnic tables, etc., and clearing of debris and trash are expected to be common maintenance needs.

The City of Udall will operate a water quality monitoring program at multipurpose Structure No. 4 to insure the maintenance of class "a" water quality standards to the satisfaction of the State Department of Health and Environment.

The watershed district will check sediment and beneficial use pools regularly during spring and summer months and take measures to control mosquito breeding.

Provisions will be made for access to inspect the structural measures at any time.

#### FINANCING PROJECT INSTALLATION

Land treatment measures will be financed by landowners and operators with partial cost sharing through the watershed district and/or state and federal programs in effect at the time of installation. Technical assistance will be provided by the Service using P.L. 46 funds and supplemented by accelerated assistance using P.L. 566 funds.

Middle Walnut Watershed District has the necessary authority and power to finance and to carry out watershed improvements. These powers include the right to accept contributions, levy taxes, make assessments against land specially benefited, issue bonds, and exercise the right of eminent domain.

Expenses of organizing the watershed district have been paid and current general expenses are being met by an annual ad valorem tax levy.

The watershed district has been furnished land rights work maps for all structural measures. These maps provide a basis for contacting landowners and appraising land rights costs. Land rights which must be purchased for flood-water retarding structures will be financed through a general tax levy. Construction and engineering costs for the flood-water retarding structures will be borne by the Service. The Service and the district will each bear their own project administration costs.

All costs to be financed by the sponsors are to be financed through funds currently on hand and budgeted for the purpose, funds that will be collected through taxes before construction takes place, and through the issuance of general obligation bonds.

The sponsor's share of relocation payments and the relocation assistance advisory services costs will be financed by the watershed district through a general tax levy.

The P.L. 566 funds for construction and land rights will be provided to the local sponsoring organizations through project agreements executed with the Soil Conservation Service.

Prior to entering into agreements that obligate funds of the Service, Middle Walnut Watershed District will have a financial management system for control, accountability, and disclosure of P.L. 566 funds received, and for control and accountability for property and other assets purchased with P.L. 566 funds.

Program income earned during the grant period will be reported on the sponsor's request for advance or reimbursement by the Service.

Federal technical assistance, engineering services, project administration, and funds for construction are contingent upon appropriations for these purposes.



**TABLES**

TABLE 1 - ESTIMATED PROJECT INSTALLATION COST

Middle Walnut Watershed, Kansas

| Installation Cost Item  | Unit                      | Number                  |                         | Estimated Cost Dollars <sup>a/</sup> |       |                                |                        |        |                        |                        |                                |
|---|---------------------------|-------------------------|-------------------------|--------------------------------------|-------|--------------------------------|------------------------|--------|------------------------|------------------------|--------------------------------|
|   |                           |                         |                         | F. L. 506 Fund:                      |       |                                |                        | Other  |                        |                        |                                |
|   |                           | Non-Fed.<br>Land        | Total                   | Non-Federal<br>SCSC/                 | FSC/  | Total                          | Non-Federal<br>SCSC/   | FSC/   | Total                  | Total                  |                                |
| <u>LAND TREATMENT</u><br><u>Land Areas<sup>b/</sup></u><br>Cropland<br>Rangeland<br>Forestland  | Acres<br>to be<br>treated | 33,622<br>10,196<br>850 | 33,622<br>10,196<br>850 |                                      |       |                                | 1,838,200<br>2,014,700 |        | 1,838,200<br>2,014,700 | 1,838,200<br>2,014,700 | 5,800                          |
| Individual Practices such as -<br>Fire control  |                           | 52,591                  | 52,591                  |                                      |       |                                |                        |        | 10,000                 | 10,000                 | 10,000                         |
| Technical Assistance  |                           |                         |                         | 100,000                              | 6,700 | 106,700                        | 160,000                | 4,100  | 164,100                | 270,800                |                                |
| TOTAL LAND TREATMENT  | xxxx                      | xxxx                    | xxxx                    | 100,000                              | 6,700 | 106,700                        | 4,012,900              | 19,900 | 4,032,800              | 4,139,500              |                                |
| <u>STRUCTURAL MEASURES</u><br><u>Construction</u><br>Floodwater Retarding Structures<br>Multipurpose Structure<br>Recreational Facilities | No.<br>No.<br>No.         | 14<br>1<br>1            | 14<br>1<br>1            | 1,572,600<br>131,000<br>67,400       |       | 1,572,600<br>131,000<br>67,400 |                        |        |                        |                        | 1,572,600<br>180,300<br>67,400 |
| Subtotal - Construction   |                           |                         |                         | 1,771,000                            |       | 1,771,000                      | 116,700                |        | 116,700                | 1,887,700              |                                |
| Engineering Services  |                           |                         |                         | 286,600                              |       | 286,600                        | 6,400                  |        | 6,400                  | 293,000                |                                |
| Relocation Payments   |                           |                         |                         | 4,900                                |       | 4,900                          | 7,600                  |        | 7,600                  | 12,500                 |                                |
| <u>Project Administration</u><br>Construction Inspection<br>Other<br>Relocation Assistance<br>Advisory Services                           |                           |                         |                         | 513,600<br>177,100                   |       | 513,600<br>177,100             | 8,000<br>500           |        | 8,000<br>500           | 513,600<br>185,100     | 500                            |
| Subtotal - Administration   |                           |                         |                         | 690,700                              |       | 690,700                        | 8,500                  |        | 8,500                  | 699,200                |                                |
| <u>Other Costs</u><br>Land Rights   |                           |                         |                         | 126,000                              |       | 126,000                        | 489,600                |        | 489,600                | 615,600                |                                |
| TOTAL STRUCTURAL MEASURES   |                           |                         |                         | 2,879,200                            |       | 2,879,200                      | 628,800                |        | 628,800                | 3,508,000              |                                |
| TOTAL PROJECT   |                           |                         |                         | 2,979,200                            | 6,700 | 2,985,900                      | 4,641,700              | 19,900 | 4,661,600              | 7,647,500              |                                |

<sup>a/</sup> Price base 1974<sup>b/</sup> Includes only areas estimated to be adequately treated during the project installation period. Treatment will be accelerated throughout the watershed, and dollar amounts apply to total land areas, not just to adequately treated areas.<sup>c/</sup> Federal agency responsible for assisting in installation of works of improvement.<sup>d/</sup> Includes \$2,600 through going programs.

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TABLE 1A - STATUS OF WATERSHED WORKS OF IMPROVEMENT

Middle Walnut Watershed, Kansas

| Measures                         | Unit | Applied to Date      | Total Cost (Dollars) <sup>a/</sup> |
|----------------------------------|------|----------------------|------------------------------------|
| <u>LAND TREATMENT</u>            |      |                      |                                    |
| <u>Soil Conservation Service</u> |      |                      |                                    |
| Conservation Cropping System     | Ac.  | 53,384               | 1,121,100                          |
| Range Proper Use                 | Ac.  | 52,219               | 52,200                             |
| Range Seeding                    | Ac.  | 3,112                | 78,000                             |
| Pasture Planting                 | Ac.  | 6,552                | 180,200                            |
| Grassed Waterway                 | Ac.  | 1,531                | 237,300                            |
| Diversion                        | Mi.  | 47                   | 29,400                             |
| Farm Pond                        | No.  | 442                  | 565,800                            |
| Grade Stabilization Structure    | No.  | 168                  | 60,500                             |
| Terrace, Gradient                | Mi.  | 460                  | 170,000                            |
| R.E.A.P. Detention Dam           | No.  | 1                    | 10,000                             |
| Subtotal SCS                     |      |                      | 2,504,500                          |
| <u>Forest Service</u>            |      |                      |                                    |
| Tree and Shrub Planting          | Ac.  | 1,400                | 50,000                             |
| Fire Control                     | Ac.  | 52,591 <sup>b/</sup> | 25,000                             |
| Subtotal FS                      |      |                      | 75,000                             |
| <b>TOTAL</b>                     |      |                      | <b>2,579,500</b>                   |

a/ Price base 1974

b/ These acres are included in table 1 as needing further treatment

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TABLE 2 - ESTIMATED STRUCTURAL COST DISTRIBUTION  
Middle Walnut Watershed, Kansas

(Dollars) a/

| Item                                   | Installation Cost P. L. 566 Funds |             |             | Construction |           |              | Installation Cost - Other Funds |             |                     | Total Instal. Cost |
|--|-----------------------------------|-------------|-------------|--------------|-----------|--------------|---------------------------------|-------------|---------------------|--------------------|
|  | Construction                      | Engineering | Land Rights | Total P. L.  | 566       | Construction | Engineering                     | Land Rights | Relocation Payments |                    |
| <b>Floodwater Retarding Structures</b> |                                   |             |             |              |           |              |                                 |             |                     |                    |
| 1                                      | 52,700                            | 8,400       |             |              |           | 61,100       |                                 |             |                     | 5,900              |
| 2                                      | 56,300                            | 9,000       |             |              |           | 65,300       |                                 |             |                     | 6,800              |
| 3                                      | 146,700                           | 23,400      |             |              |           | 170,100      |                                 |             |                     | 18,600             |
| 5                                      | 172,600                           | 27,600      |             |              |           | 200,200      |                                 |             |                     | 18,100             |
| 6                                      | 188,800                           | 30,200      |             |              |           | 219,000      |                                 |             |                     | 40,900             |
| 7                                      | 146,100                           | 23,400      |             |              |           | 169,500      |                                 |             |                     | 90,800             |
| 8                                      | 102,300                           | 16,400      |             |              |           | 118,700      |                                 |             |                     | 18,900             |
| 9                                      | 87,800                            | 14,000      |             |              |           | 101,800      |                                 |             |                     | 20,000             |
| 10                                     | 139,900                           | 22,300      |             |              |           | 162,200      |                                 |             |                     | 23,300             |
| 11                                     | 70,500                            | 11,300      |             |              |           | 81,800       |                                 |             |                     | 8,000              |
| 12                                     | 161,900                           | 25,900      |             |              |           | 187,800      |                                 |             |                     | 52,800             |
| 13                                     | 79,500                            | 12,700      |             |              |           | 92,200       |                                 |             |                     | 21,900             |
| 14                                     | 73,200                            | 11,700      |             |              |           | 84,900       |                                 |             |                     | 6,900              |
| 15                                     | 94,300                            | 15,100      |             |              |           | 109,400      |                                 |             |                     | 27,000             |
| Subtotal FRS                           | 1,572,600                         | 251,400     |             |              |           | 1,824,000    |                                 |             |                     | 359,900            |
| MP Struc.                              |                                   |             |             |              |           |              |                                 |             |                     | 2,183,900          |
| No. 4 Recreational Facilities          | 131,000                           | 28,800      | 93,000      | 4,900        | 257,700   | 49,300       | 1/                              | 96,000      | 7,600               | 152,900            |
| Subtotal No. 4 Total Project Admin.    | 198,400                           | 6,400       | 33,000      |              | 106,800   | 67,400       | 6,400                           | 33,700      |                     | 107,500            |
| Total Project Admin.                   | 1,771,000                         | 286,600     | 126,000     | 4,900        | 364,500   | 116,700      | 6,400                           | 129,700     | 7,600               | 260,400            |
| GRAND TOTAL                            | 1,771,000                         | 286,600     | 126,000     | 4,900        | 2,879,200 | 116,700      | 6,400                           | 489,600     | 7,600               | 620,300            |
|  |                                   |             |             |              |           |              |                                 |             |                     | 8,500              |
|  |                                   |             |             |              |           |              |                                 |             |                     | 699,200            |
|  |                                   |             |             |              |           |              |                                 |             |                     | 3,508,000          |

\* See footnotes on following page

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FOOTNOTES

Table 2 - Estimated Structural Cost Distribution  
Middle Walnut Watershed, Kansas

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- Price base 1974
- a/ Includes \$2,600 for road modification
- b/ Includes \$15,000 to purchase buildings and for road modification
- c/ Includes \$2,900 to dike around farmstead & \$28,300 for road modification
- d/ Includes \$300 to dike around farmstead
- e/ Includes \$450 to dike around farmstead
- f/ Includes \$1,900 for road modification
- g/ Includes \$4,000 for road modification, \$5,000 for bridge modification, \$1,300 to dike around farmstead
- h/ Includes \$500 for easements and \$2,500 for legal fees
- i/ Includes \$700 for legal fees
- j/ Includes \$32,300 for easements, \$500 for legal fees, and \$20,000 for road and utility modifications
- k/ For engineering contract
- l/

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TABLE 2A - COST ALLOCATION AND COST SHARING SUMMARY

Middle Walnut Watershed, Kansas

(Dollars) <sup>a/</sup>

| Item  | COST ALLOCATION  |             | COST SHARING |                  |             | OTHER     |                  |             |         |
|---|------------------|-------------|--------------|------------------|-------------|-----------|------------------|-------------|---------|
|   | Flood Prevention | Recrea-tion | Total        | Flood Prevention | Recrea-tion | Total     | Flood Prevention | Recrea-tion |         |
| 14 Floodwater Retarding Struc.                                    | 2,183,900        |             | 2,183,900    | 1,824,000        |             | 1,824,000 | 359,900          |             | 359,900 |
| Multipurpose Struc. No. 4 (floodwater retarding and recreational) | 95,400           | 315,200     | 410,600      | 94,900           | 162,800     | 257,700   | 500              | 152,400     | 152,900 |
| Recreational Facilities   |                  | 214,300     | 214,300      |                  | 106,800     | 106,800   |                  | 107,500     | 107,500 |
| GRAND TOTAL   | 2,279,300        | 529,500     | 2,808,800    | 1,918,900        | 269,600     | 2,188,500 | 360,400          | 259,900     | 620,300 |

<sup>a/</sup> Price base 1974

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TABLE 2B - RECREATIONAL FACILITIES  
ESTIMATED CONSTRUCTION COSTS

Middle Walnut Watershed, Kansas

| <u>Facilities</u>  | <u>Number</u> | <u>Unit Cost</u> | <u>Total</u> |
|--|---------------|------------------|--------------|
| Access Roads   |               |                  |              |
| (two-way gravel) (24' width)   | 3,800'        | \$3.00/lin.ft.   | \$ 11,400    |
| (one-way gravel) (12' width)   | 1,200'        | \$2.50/lin.ft.   | 3,000        |
| Concrete Boat Ramp and Gravel<br>Parking Area for 15 Vehicles                | 1             | \$3,500          | 3,500        |
| Electric Utility and Lights  | 4,000'        | \$2.25/ft.       | 9,000        |
| Vault Type Toilet (Two-unit)   | 2             | \$6,500          | 13,000       |
| Comfort Station (campgrounds)  | 1             | \$15,000         | 15,000       |
| Bathhouse  | 1             | \$12,000         | 12,000       |
| Water Supply Line (from City<br>Water Line)                                  | 3,600'        | \$2.25/ft.       | 8,100        |
| Gravel Parking Areas (50 Vehicles)   | 500'          | \$3.00/lin.ft.   | 1,500        |
| Grills (Waist high)  | 10            | \$70             | 700          |
| Floating Dock (Steel and Foam)   | 1             | \$1,500          | 1,500        |
| 8' Picnic Table (Treated Wood<br>w/Steel Legs)                               | 20            | \$100            | 2,000        |
| Sewage Lagoon and Pipe<br>(Chain Link Fence around Lagoon)                   |               | Lump Sum         | 5,000        |
| Daisy Campground (Trailer Spurs,<br>Sewage Dump Station, Table<br>and Grill) | 1 - 30 units  | \$325            | 9,800        |
| Landscaping (throughout<br>Recreation Area)                                  |               | Lump Sum         | 3,000        |
| Picnic Shelter   | 3             | \$1,500          | 4,500        |
| Swimming Beach and Parking Area<br>for 50 Vehicles                           |               | Lump Sum         | 7,000        |
| Signs, directional   |               | Lump Sum         | 500          |
| Nature Trail 6000'   |               | Lump Sum         | 1,500        |
| Fence  |               | Lump Sum         | 10,000       |
| Refuse Cans  | 35            | \$14             | 500          |
|  |               | Subtotal         | 122,500      |
|  |               | Contingencies    | 12,300       |
|  |               | TOTAL            | 134,800      |

TABLE 3 - STRUCTURE DATA  
MULTIPURPOSE AND FLOODWATER RETARDING STRUCTURES  
Middle Walnut Watershed, Kansas

| ITEM                                     | UNIT     | STRUCTURE NUMBER |          |          |          |          |          | 8        |
|--|----------|------------------|----------|----------|----------|----------|----------|----------|
|  |          | 1                | 2        | 3        | 4        | 5        | 6        |          |
| Class of Structure                       |          | a                | b        | b        | a        | b        | b        | b        |
| Drainage Area                            | Sq. Mi.  | 1.07             | 1.00     | 2.68     | 4.98     | 6.23     | 9.34     | 2.61     |
| Controlled Curve No. (1-day) (AMC II)    | Sq. Mi.  | --               | --       | --       | --       | --       | 2.57     | --       |
| TC                                       | Hours    | 0.7              | 0.8      | 1.7      | 79       | 80       | 81       | 81       |
| Elevation Top of Dam                     | Feet     | 1,165.5          | 1,175.2  | 1,201.2  | 1,221.8  | 1,253.0  | 1,293.1  | 1,284.8  |
| Elevation Crest Emergency Spillway       | Feet     | 1,160.5          | 1,170.2  | 1,196.2  | 1,216.8  | 1,247.1  | 1,288.1  | 1,279.8  |
| Elevation Crest Low Stage Inlet          | Feet     | 1,153.7          | 1,160.1  | 1,186.9  | 1,211.2  | 1,236.9  | 1,275.5  | 1,270.5  |
| Maximum Height of Dam                    | Feet     | 22.0             | 25.0     | 29.0     | 31.8     | 34.0     | 34.2     | 27.4     |
| Volume of Fill                           | Cu. Yds. | 32,400           | 42,000   | 119,900  | 115,100  | 69,500   | 145,300  | 90,900   |
| Total Capacity                           | Ac. Ft.  | 235              | 227      | 653      | 1,667    | 897      | 1,545    | 2,724    |
| Sediment Submerged                       | Ac. Ft.  | 57               | 27       | 126      | 297      | 230      | 224      | 788      |
| Sediment Aerated                         | Ac. Ft.  | 6                | 3        | 14       | 25       | 26       | 33       | 108      |
| Beneficial Use                           | Ac. Ft.  | --               | --       | --       | --       | --       | --       | 12       |
| Retarding                                | Ac. Ft.  | 172              | 197      | 513      | 982      | 611      | 1,296    | --       |
| Surface Area                             | Acres    | 16               | 8        | 30       | 60       | 40       | 45       | 30       |
| Sediment Pool                            | Acres    | --               | --       | 87       | 93(REC)  | --       | --       | --       |
| Beneficial Use Pool                      | Acres    | 37               | 33       | 33       | 152      | 96       | 168      | 133      |
| Retarding Pool                           | Acres    | --               | --       | --       | --       | --       | 351      | --       |
| Principal Spillway                       |          |                  |          |          |          |          |          |          |
| Rainfall Volume (areal) (1-day)          | Inches   | 6.4              | 7.2      | 7.1      | 6.3      | 7.1      | 7.1      | 7.1      |
| Rainfall Volume (areal) (10-day)         | Inches   | 10.4             | 11.8     | 11.7     | 10.2     | 11.6     | 11.5     | 11.5     |
| Runoff Volume (10-day)                   | Inches   | 5.9              | 7.1      | 7.0      | 5.7      | 7.1      | 7.0      | 7.0      |
| Capacity of High Stage (Max.)            | c.f.s.   | .38              | .37      | .99      | .156     | .163     | .218     | .58      |
| Frequency Operation - Emergency Spillway | % Chance | 4                | 2        | 2        | 4        | 2        | 2        | 2        |
| Size of Conduit                          | Dia.     | 24"              | 24"      | 30"      | 36"      | 42"      | 42"      | 24"      |
| Emergency Spillway                       |          |                  |          |          |          |          |          |          |
| Rainfall Volume (FSH) (areal)            | Inches   | 6.6              | 8.6      | 8.6      | 8.80     | 8.6      | 8.6      | 8.6      |
| Runoff Volume (FSH)                      | Inches   | 4.32             | 6.19     | 6.07     | 6.07     | 6.38     | 6.29     | 6.29     |
| Type                                     | Veg.     | Veg.             | Veg.     | Veg.     | Veg.     | Veg.     | Veg.     | Veg.     |
| Bottom Width                             | Feet     | 40               | 80       | 110      | 140      | 260      | 500      | 120      |
| Velocity of Flow ( $v_e$ ) <sup>a</sup>  | Ft./Sec. | 5.7              | 6.8      | 7.2      | 6.0      | 7.2      | 7.0      | 6.7      |
| Slope of Exit Channel                    | Ft./Ft.  | 0.0              | 0.35     | 0.32     | 0.31     | 0.32     | 0.33     | 0.36     |
| Maximum Water Surface Elevation          | Feet     | 1,162.02         | 1,172.34 | 1,198.55 | 1,219.20 | 1,248.86 | 1,261.12 | 1,290.35 |
| Freeboard                                | Inches   | 8.6              | 14.6     | 14.6     | 12.6     | 14.6     | 14.6     | 14.6     |
| Rainfall Volume (FH) (areal)             | Inches   | 6.19             | 11.98    | 11.83    | 10.04    | 12.11    | 12.11    | 12.11    |
| Runoff Volume (FH)                       | Feet     | 1,163.28         | 1,174.94 | 1,201.18 | 1,221.80 | 1,250.45 | 1,263.30 | 1,292.57 |
| Maximum Water Surface Elevation          |          |                  |          |          |          |          |          | 1,283.97 |
| Capacity Equivalents                     |          |                  |          |          |          |          |          |          |
| Sediment Volume                          | Inches   | 1.10             | 0.96     | 0.98     | 1.12     | 0.75     | 0.67     | 0.86     |
| Retarding Volume                         | Inches   | 3.00             | 3.70     | 3.60     | 3.70     | 3.00     | 4.80     | 4.80     |

<sup>a</sup>/ Maximum during passage of hydrograph

August 1975

TABLE 3 - CONTINUED  
MULTIPURPOSE AND FLOODWATER RETARDING STRUCTURES

Middle Walnut Watershed, Kansas

| ITEM                                     | UNIT     | STRUCTURE NUMBER |          |          |          |          |          |          |          |          |           | Total     |
|--|----------|------------------|----------|----------|----------|----------|----------|----------|----------|----------|-----------|-----------|
|  |          | 9                | 10       | 11       | b        | c        | b        | a        | b        | a        | 14        | 15        |
| Sq. Mi.                                  |          | 2.26             | 2.57     | 0.90     | 5.23     | 2.04     | 1.08     | 2.40     | --       | --       | 2.40      | 48.40     |
| Sq. Mi.                                  |          | --               | --       | --       | --       | --       | --       | --       | --       | --       | --        | xxxx      |
| Hours                                    |          | 79               | 81       | 0.7      | 81       | 79       | 78       | 78       | 78       | 78       | 78        | xxxx      |
| Feet                                     |          | 1,254.0          | 1,324.7  | 1,314.5  | 1,322.0  | 1,269.7  | 1,282.8  | 1,294.5  | 1,277.8  | 1,277.8  | 1,285.5   | xxxx      |
| Feet                                     |          | 1,248.6          | 1,319.7  | 1,308.5  | 1,314.2  | 1,261.7  | 1,277.8  | 1,280.5  | 1,269.7  | 1,269.7  | 1,280.8   | xxxx      |
| Feet                                     |          | 1,241.6          | 1,311.6  | 1,302.7  | 1,301.0  | 1,257.7  | 1,269.7  | 1,280.8  | 1,257.7  | 1,257.7  | 1,280.8   | xxxx      |
| Feet                                     |          | 24.0             | 20.2     | 21.0     | 21.0     | 20.2     | 20.2     | 20.2     | 20.2     | 20.2     | 20.2      | xxxx      |
| Cu. Yds.                                 |          | 66,900           | 111,700  | 45,500   | 135,200  | 56,800   | 66,800   | 73,400   | 66,800   | 66,800   | 73,400    | 1,275,600 |
| Ac. Ft.                                  |          | 469              | 765      | 242      | 1,541    | 498      | 219      | 577      | 577      | 577      | 13,047    | xxxx      |
| Ac. Ft.                                  |          | 97               | 96       | 45       | 150      | 76       | 46       | 93       | 93       | 93       | 2,983     | xxxx      |
| Ac. Ft.                                  |          | 11               | 11       | 5        | 41       | 8        | 5        | 10       | 10       | 10       | 210       | xxxx      |
| Ac. Ft.                                  |          | --               | --       | --       | --       | --       | --       | --       | --       | --       | 388 (REZ) | xxxx      |
| 'c. Ft.                                  |          | 361              | 658      | 192      | 1,340    | 414      | 168      | 474      | 474      | 474      | 10,466    | xxxx      |
| Acres                                    |          | 29               | 40       | 13       | 37       | 25       | 13       | 26       | 26       | 26       | 26        | 485       |
| Acres                                    |          | --               | --       | --       | --       | --       | --       | --       | --       | --       | 93 (REZ)  | xxxx      |
| Acres                                    |          | 83               | 124      | 49       | 204      | 100      | 30       | 96       | 96       | 96       | 96        | 1,743     |
| Sediment Pool                            |          |                  |          |          |          |          |          |          |          |          |           |           |
| Beneficial Use                           |          |                  |          |          |          |          |          |          |          |          |           |           |
| Retarding Pool                           |          |                  |          |          |          |          |          |          |          |          |           |           |
| Principal Spillway                       |          |                  |          |          |          |          |          |          |          |          |           |           |
| Rainfall Volume (areal) {1-day}          | Inches   | 6.3              | 7.1      | 7.1      | 7.9      | 7.1      | 6.3      | 7.1      | 7.1      | 7.1      | 7.1       | xxxx      |
| Rainfall Volume (areal) {10-day}         | Inches   | 10.1             | 11.4     | 11.4     | 12.7     | 11.5     | 10.1     | 11.5     | 11.5     | 11.5     | 11.5      | xxxx      |
| Runoff Volume (10-day)                   | Inches   | 5.5              | 6.9      | 6.8      | 7.9      | 6.7      | 5.3      | 6.7      | 6.7      | 6.7      | 6.7       | xxxx      |
| Capacity of High Stage (Max.)            | C.f.s.   | 86               | 47       | 24       | 156      | 76       | 39       | 87       | 87       | 87       | 87        | xxxx      |
| Frequency Operation - Emergency Spillway | % Chance | 4                | 2        | 1        | 2        | 1        | 2        | 2        | 2        | 2        | 2         | xxxx      |
| Size of Conduit                          | Dia.     | 30"              | 24"      | 18"      | 36"      | 30"      | 24"      | 30"      | 30"      | 30"      | 30"       | xxxx      |
| Emergency Spillway                       |          |                  |          |          |          |          |          |          |          |          |           |           |
| Rainfall Volume (ESH) (areal)            | Inches   | 6.0              | 8.6      | 3.6      | 11.7     | 8.6      | 6.0      | 8.6      | 8.6      | 8.6      | 8.6       | xxxx      |
| Runoff Volume (ESH)                      | Inches   | 3.68             | 6.29     | 6.19     | 9.28     | 6.07     | 3.54     | 5.95     | 5.95     | 5.95     | 5.95      | xxxx      |
| Type                                     | Veg.     |                  |          |          |          |          |          |          |          |          |           |           |
| Ection Width                             | Feet     | 80               | 120      | 80       | 100      | 80       | 40       | 80       | 80       | 80       | 80        | xxxx      |
| Velocity of Flow (Ve) <sup>a</sup> /     | Ft./Sec. | 5.8              | 5.4      | 5.9      | 6.6      | 5.7      | 4.8      | 6.7      | 6.7      | 6.7      | 6.7       | xxxx      |
| Slope of Exit Channel                    | Ft./Ft.  | .040             | .035     | .010     | .032     | .034     | .030     | .030     | .030     | .030     | .030      | xxxx      |
| Maximum Water Surface Elevation          | Feet     | 1,250.24         | 1,321.82 | 1,308.93 | 1,317.42 | 1,266.82 | 1,279.39 | 1,291.65 | 1,291.65 | 1,291.65 | 1,291.65  | xxxx      |
| Freeboard                                |          |                  |          |          |          |          |          |          |          |          |           |           |
| Rainfall Volume (FH) (areal)             | Inches   | 8.6              | 14.6     | 28.0     | 14.6     | 8.6      | 14.6     | 11.70    | 11.70    | 11.70    | 11.70     | xxxx      |
| Runoff Volume (FH)                       | Inches   | 6.07             | 12.11    | 11.98    | 25.27    | 11.83    | 5.95     | 1,293.92 | 1,293.92 | 1,293.92 | 1,293.92  | xxxx      |
| Maximum Water Surface Elevation          | Feet     | 1,251.52         | 1,242.02 | 1,210.79 | 1,322.00 | 1,269.14 | 1,280.81 |          |          |          |           |           |
| Capacity Equivalents                     |          |                  |          |          |          |          |          |          |          |          |           |           |
| Sediment Volume                          | Inches   | 0.90             | 0.78     | 1.04     | 0.72     | 0.77     | 0.88     | 0.80     | 0.80     | 0.80     | 0.80      | xxxx      |
| Retarding Volume                         | Inches   | 3.00             | 4.80     | 4.00     | 4.80     | 3.80     | 2.90     | 3.70     | 3.70     | 3.70     | 3.70      | xxxx      |

<sup>a</sup>/ Maximum during passage of hydrograph

TABLE 4 - ANNUAL COSTS

Middle Walnut Watershed, Kansas  
 (Dollars)a/

| Evaluation Unit   | Amortization of Installation Costs b/ | Operation and Maintenance Costs | Total   |
|---|---------------------------------------|---------------------------------|---------|
| 14 Floodwater Retarding Structures,<br>1 Multipurpose Structure, and<br>Recreational Facilities | 165,600                               | 26,600c/                        | 192,200 |
| Project Administration  | 41,200                                | --                              | 41,200  |
| GRAND TOTAL   | 206,800                               | 26,600                          | 233,400 |

a/ Price base 1974

b/ 100 years at 5 7/8% interest

c/ Includes \$18,700 for operation, maintenance and replacement of recreational facilities.

August 1975

TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS

## Middle Walnut Watershed, Kansas

(Dollars)<sup>a/</sup>

| Item                | Estimated Average Annual Damage |              | Damage Reduction Benefits from Evaluated Tributaries |
|---------------------|---------------------------------|--------------|--|
|                     | Without Project                 | With Project |  |
| Floodwater          |                                 |              |  |
| Crop and Pasture    | 104,000                         | 35,900       | 68,100   |
| Other Agricultural  | 19,200                          | 6,100        | 13,100   |
| Nonagricultural     |                                 |              |  |
| Road and Bridge     | 14,200                          | 4,800        | 9,400  |
| Urban               | 2,600                           | 2,600        | --   |
| Subtotal            | 140,000                         | 49,400       | 90,600   |
| Sediment Deposition | 15,500                          | 11,800       | 3,700  |
| Erosion             |                                 |              |  |
| Flood Plain Scour   | 21,600                          | 11,800       | 9,800  |
| Indirect            | 16,300                          | 5,800        | 10,500   |
| Subtotal            | 193,400                         | 78,800       | 114,600  |

| Item                | Estimated Average Annual Damage |              | Damage Reduction Benefits to Walnut River Properties Within the Watershed |
|---------------------|---------------------------------|--------------|---|
|                     | Without Project                 | With Project |   |
| Floodwater          |                                 |              |   |
| Crop and Pasture    | --                              | --           | 7,200   |
| Other Agricultural  | --                              | --           | 1,500   |
| Nonagricultural     |                                 |              |   |
| Road and Bridge     | --                              | --           | 1,300   |
| Urban               | --                              | --           | --  |
| Subtotal            | --                              | --           | 10,000  |
| Sediment Deposition | --                              | --           | --  |
| Erosion             |                                 |              |   |
| Flood Plain Scour   | --                              | --           | 1,400   |
| Indirect            | --                              | --           | 1,200   |
| Subtotal            | --                              | --           | 12,600  |

| Item                | Estimated Average Annual Damage |              | Damage Reduction Benefits to Walnut River Properties Outside the Watershed |
|---------------------|---------------------------------|--------------|--|
|                     | Without Project                 | With Project |  |
| Floodwater          |                                 |              |  |
| Crop and Pasture    | --                              | --           | 10,100   |
| Other Agriculture   | --                              | --           | 2,000  |
| Nonagricultural     |                                 |              |  |
| Road and Bridge     | --                              | --           | 1,800  |
| Urban               | --                              | --           | 19,200   |
| Subtotal            | --                              | --           | 33,100   |
| Sediment Deposition | --                              | --           | --   |
| Erosion             |                                 |              |  |
| Flood Plain Scour   | --                              | --           | 2,000  |
| Indirect            | --                              | --           | 1,700  |
| Subtotal            | --                              | --           | 36,800   |
| GRAND TOTAL.        | 193,400                         | 78,800       | 164,000  |

<sup>a/</sup> Current price base except agricultural price base which utilizes WRC normalized prices issued October 1974

TABLE 6 - COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Middle Walnut Watershed, Kansas

(Dollars)

| Evaluation Unit                                       | Average Annual Benefits <sup>a/</sup> |                         |                | Secondary Total | Average Annual Cost <sup>c/</sup> | Benefit Cost Ratio   |
|---|---------------------------------------|-------------------------|----------------|-----------------|-----------------------------------|----------------------|
|   | Damage Reduction <sup>b/</sup>        | More Intensive Land Use | Recreation     |                 |                                   |                      |
| 14 Floodwater Retarding Structures,                   |                                       |                         |                |                 |                                   |                      |
| 1 Multipurpose Structure, and Recreational Facilities | 126,300                               | 33,100                  | 112,500        | 52,000          | 323,900                           | 192,200 1.7:1        |
| Project Administration                                |                                       |                         |                |                 |                                   | 41,200               |
| <u>GRAND TOTAL</u>                                    | <u>126,300</u>                        | <u>33,100</u>           | <u>112,500</u> | <u>52,000</u>   | <u>323,900</u>                    | <u>233,400 1.4:1</u> |

a/ Current price base except agricultural base which utilizes WRC normalized prices issued October 1974.

b/ In addition it is estimated that land treatment measures will provide flood damage reduction benefits of \$37,700 annually.

c/ Price base 1974. 100 years at 5 7/8 percent interest. Includes \$18,700 for operation, maintenance, and replacement of recreational facilities.

PRINCIPLES AND STANDARDS PHASE-IN

ADDENDUM

for

MIDDLE WALNUT WATERSHED, KANSAS

This addendum shows the project costs,a/benfits,b/and benefit-cost ratio based on 100 years at 6 1/8 percent interest rate.

1. Average annual project costs are \$241,900.
2. Average annual project benefits are \$322,100.
3. The project benefit-cost ratio is 1.3:1.
4. Average annual project benefits without secondary benefits are \$271,600.
5. The project benefit-cost ratio without secondary benefits is 1.1:1.

a/ Price base 1974

b/ Current price base except agricultural base which utilizes WRC normalized prices issued October 1974.



PRINCIPLES AND STANDARDS PHASE-IN

ADDENDUM

for

MIDDLE WALNUT WATERSHED, KANSAS

This addendum shows an abbreviated environmental quality plan consistent with part C.2 of the WRC "Schedule and Application of Principles and Standards to Implementation Studies in Process" published in the Federal Register of July 24, 1974.

**Environmental Problems**

**A. Areas of Natural Beauty and Human Enjoyment**

Areas for public use are lacking in the watershed. Demand for public use area will increase. Lakes are needed to add open space and diversity to the landscape.

**B. Biological Resources**

Competition for land uses has resulted in wildlife habitat losses. The continuing development of residential areas contributes to this problem. Hunting access and landowner-sportsman relationship problems will become more acute as competition for land increases. No harvestable fishery exists in the middle and upper reaches of right-bank tributaries to the Walnut River due to their intermittent nature. There exists only a limited number of artificial impoundments for public and private fishing. Existing riparian habitat is in danger of eradication due to agricultural and urban encroachment.

**C. Land, Water and Air Quality**

Soil erosion is a problem on 65,350 acres of agricultural land. Deposition of sediment in stream channels is reducing channel capacity and adversely affecting stream water quality.

**D. Conflicts in Land Use**

Projected population increases, potentials for increased industrial development, and continuing land and space competition make it important that resource problems be anticipated and that people have the authority to deal with them.

Component Needs

A. Areas of Natural Beauty and Human Enjoyment

Creation of public use open space areas.

B. Biological Resources

Improvement of fish and wildlife habitat within the watershed.

Preservation of existing riparian habitat.

C. Land, Water, and Air Quality

Establish proper conservation management systems on lands within the watershed.

D. Conflicts in Land Use

Establish a comprehensive land use plan.

Environmental Quality Plan Elements

A. Management, protection, enhancement, and creation of areas of natural beauty and human enjoyment.

1. Establish 5 public use open space areas by purchasing and developing 2,141 acres. Establish within the open space 552 surface acres of reservoirs and 1,589 acres of public use areas.

Installation by: State Park and Resources Authority; Kansas Forestry, Fish and Game Commission; local sponsors

Technical Assistance by: Kansas Forestry, Fish and Game Commission; State Park and Resources Authority; Soil Conservation Service.

Cost: \$4,009,800      OM&R: \$101,800

B. Management, preservation, and enhancement of especially valuable or outstanding biological resources or ecosystems.

1. Improve terrestrial wildlife habitat by:

a. Establishing 160 miles of woody and herbaceous cover on farm and field boundaries.

Installation by: Landowners (cost-sharing program needed).

Technical Assistance by: Kansas State and Extension Forestry; Soil Conservation Service; Kansas Forestry, Fish and Game Commission

Cost: \$30,000 OM&R: \$200

b. Conversion of 600 acres of flood plain cropland scour channels to perennial cover.

Installation by: Kansas Forestry, Fish and Game Commission; landowners (cost-sharing program needed).

Technical Assistance by: Kansas Forestry, Fish and Game Commission; Soil Conservation Service

Cost: \$330,000 OM&R: \$1,500

2. Protect existing riparian habitat by obtaining easements on 8,000 acres of tributary flood plain for the purpose of eliminating land use conversion adjacent to the channel.

Installation by: Kansas Forestry, Fish and Game Commission; landowners (cost-sharing program needed)

Technical Assistance by: Kansas Forestry, Fish and Game Commission

Cost: \$400,000 OM&R: \$15,000

3. Survey the occurrence of rare and endangered species and their habitat needs.

Installation by: Kansas Forestry, Fish and Game Commission

Technical Assistance by: Kansas Forestry, Fish and Game Commission

Cost: \$4,000

C. Improve quality of land, water and air

1. Install land treatment measures and establish proper management systems on 35,200 acres of cropland, 29,300 acres of rangeland, and 850 acres of woodland. Provide 52,591 acres of additional fire control.

Installation by: RECP, landowners

Technical Assistance by: Soil Conservation Service; Kansas State and Extension Forestry

Cost: \$4,363,300      OM&R: 872,700

D. Avoid irreversible and irretrievable commitments of resources.

1. Establish a comprehensive plan including land and water use.

Installation by: Local and regional planning units

Technical Assistance by: KDED

Cost: \$60,000

Total Environmental Quality Plan Installation Cost - \$9,197,100

Annual Operation, Maintenance, and Replacement - \$ 989,700

## Effects of Environmental Quality Plan

### A. Areas of Natural Beauty and Human Enjoyment

The creation of five public use reservoirs will provide facilities for 105,000 sightseers, 35,000 boaters, 32,500 picnickers, 37,500 campers, 45,000 fishermen, 30,000 swimmers, and 5,000 other users annually, totaling 250,000 visitor use days annually. Acquisition of areas associated with the development will provide 750 acres for dam, reservoirs, and facilities and 839 acres of open space and buffer zone. Creation of the public use areas will cause disruption in the tranquility of the rural environment by 250,000 users annually.

### B. Biological Resources

The creation of five recreational reservoirs will inundate 552 acres of terrestrial wildlife habitat and inundate 7.5 miles of intermittent stream aquatic habitat. The reservoir developments will create 552 acres of impounded aquatic habitat.

Conservation land treatment on 65,350 acres of agricultural land plus conversion of 600 acres of flood plain land to wildlife land will improve terrestrial wildlife habitat within the watershed. Creating 160 miles of woody and herbaceous cover on farm and field boundaries will provide essential edge cover needed for terrestrial wildlife habitat improvement.

The existence of and habitat needs of rare and endangered species within the watershed will be identified.

Plan action will maintain the environmental condition of 55 miles of stream channel through preservation and management of an existing 8,000 acres of riparian habitat.

### C. Land, Water, and Air Quality

The application of conservation practices on 100 percent of the untreated cropland and grassland in the watershed will improve the quality of land, air, and water on 65,350 acres of agricultural land. This action

will bring all 177,000 acres of agricultural land in the watershed under conservation treatment. Land treatment measures will reduce sediment yield from 106 to 64 acre feet per year. Land treatment plus the installation of five reservoirs will reduce sediment yields to 58 acre feet per year.

D. Irreversible and Irretrievable Commitments

Reservoirs will convert 1,285 acres of cropland, 535 acres of rangeland, 321 acres of woodland, and 7.5 miles of intermittent stream to reservoir pools, dams, spillways, and public use areas.

E. Conflicts in Land Use

Implemented land and water use planning for the watershed area will provide the authority to deal with conflicts in the use of these resources. Growth is inevitable in the watershed and a comprehensive plan will assist it to proceed in an orderly manner. Important environmental elements will be recognized and protected through development and implementation of the plan.

PRINCIPLES AND STANDARDS PHASE-IN

ADDENDUM

for

MIDDLE WALNUT WATERSHED, KANSAS

This addendum shows abbreviated displays of the selected plan consistent with part C.3 of the WRC "Schedule and Application of Principles and Standards to Implementation Studies in Process" published in the Federal Register of July 24, 1974. The following accounts are displayed:

National Economic Development Account

Regional Development Account

Social Well-Being Account

Environmental Quality Account



## SELECTED PLAN

## NATIONAL ECONOMIC DEVELOPMENT ACCOUNT

## MIDDLE WALNUT WATERSHED, KANSAS

| <u>Components</u> | <u>Measure of effects<br/>(average annual<br/>dollars)</u> | <u>Components</u> | <u>Measure of effects<br/>(average annual<br/>dollars)</u> |
|-------------------|--|-------------------|--|
|-------------------|--|-------------------|--|

## Beneficial effects

A. The value to users  
of increased outputs  
of goods and services

1. Flood prevention \$159,400
2. Recreation 112,500

Total Beneficial Effects

\$271,900

## Adverse effects

A. The value of resources  
required for a plan

1. Multipurpose reservoir and 14 single-purpose flood prevention reservoirs

Project Installationa/

\$165,600

Project Administrationa/

41,200

OM&R

26,600

Total Adverse Effects

\$233,400

Net Beneficial Effects

\$ 38,500

a/ Amortized for 100 years at 5 7/8 percent interest



## SELECTED PLAN

### REGIONAL DEVELOPMENT ACCOUNT MIDDLE WALNUT WATERSHED, KANSAS

|  | Measure of effects<br>(average annual<br>dollars) |               | Measure of effects<br>(average annual<br>dollars) |               |
|--|---|---------------|---|---------------|
|  | <u>Watershed</u>                                  | <u>Nation</u> | <u>Watershed</u>                                  | <u>Nation</u> |
| A. Income  |   |               |   |               |
| Beneficial effects   |   |               |   |               |
| 1. The value of increased output of goods and services to users residing in the region |   |               |   |               |
| a. Flood prevention  | 159,400   |               |   |               |
| b. Recreation  | 100,200   | 12,300        |   |               |
| c. Secondary   | 52,000  |               |   |               |
| Adverse effects  |   |               |   |               |
| 1. The value of resources contributed from within the region to achieve the output     |   |               |   |               |
| a. Multipurpose reservoir and 14 single-purpose flood prevention structures            |   |               |   |               |
| Project Installation <sup>a/</sup>   |   |               | 36,600  | 129,000       |
| Project Administration <sup>a/</sup>   |   |               | 500   | 40,700        |
| OM&R   |   |               | 26,600  |               |
| Total Beneficial Effects   | 311,600   | 12,300        |   |               |
| Total Adverse Effects  |   |               | 63,700  | 169,700       |
| Net Beneficial Effects   |   |               | 247,900   |               |

<sup>a/</sup> Amortized for 100 years at 5 7/8 percent interest



## SELECTED PLAN

REGIONAL DEVELOPMENT ACCOUNT  
MIDDLE WALNUT WATERSHED, KANSAS

| <u>Components</u>                          | <u>Measure of effects</u>                       |               | <u>Components</u>                          | <u>Measure of effects</u>                       |
|--|---|---------------|--|---|
|  | <u>Watershed</u>                                | <u>Nation</u> |  | <u>Rest of Nation</u>                           |
| B. Employment                              |   |               | B. Employment                              |   |
| Beneficial effects                         |   |               | Adverse effects                            |   |
| 1. Increase in the number and type of jobs |   |               | 1. Decrease in the number and type of jobs |   |
| a. Employment for project construction     | 50 man years semiskilled during a 7-year period |               | Total Adverse Effects                      | 0   |
| b. Employment for project OM&R             | 16 man years unskilled during a 7-year period   |               | Net Beneficial Effects                     | 3 permanent semiskilled jobs                    |
|  | 3 man years semiskilled annually                |               |  | 50 man years semiskilled during a 7-year period |
|  | 3 permanent semiskilled jobs                    |               |  | 16 man years unskilled during a 7-year period   |
| Total Beneficial Effects                   | 50 man years semiskilled during a 7-year period |               |  | 16 man years unskilled during a 7-year period   |



## SELECTED PLAN

## REGIONAL DEVELOPMENT ACCOUNT

## MIDDLE WALNUT WATERSHED, KANSAS

| <u>Components</u>                          | <u>Measure of effects</u>   | <u>Rest of<br/>Nation</u> |
|--|---|---------------------------|
|  | <u>Watershed</u>  |                           |
| C. Population Distribution                 |   |                           |
| Beneficial effects                         | Creates 50 man years<br>semiskilled employment<br>during a 7-year period  |                           |
|  | Creates 16 man years<br>unskilled employment<br>during a 7-year period  |                           |
|  | Creates 3 man years per-<br>manent employment annually  | -                         |
| Adverse effects                            | -   | -                         |
| D. Regional Economic Base<br>and Stability |   |                           |
| Beneficial effects                         | Provides floodwater<br>damage reduction for<br>8,636 acres on flood<br>plain and 30,536 acres<br>of Walnut River lands          |                           |
|  | Creates annually 3 man<br>years of semiskilled<br>employment  |                           |
|  | Creates 50 man years<br>short-term semiskilled<br>and 16 man years short-term<br>unskilled employment during<br>a 7-year period |                           |

## SELECTED PLAN

## SOCIAL WELL-BEING ACCOUNT

## MIDDLE WALNUT WATERSHED, KANSAS

| <u>Components</u>              | <u>Measure of effects</u>   |               |    |                     |     |               |     |               |     |                     |     |               |     |  |
|--------------------------------|---|---------------|----|---------------------|-----|---------------|-----|---------------|-----|---------------------|-----|---------------|-----|--|
| Beneficial and adverse effects |   |               |    |                     |     |               |     |               |     |                     |     |               |     |  |
| A. Real income distribution    | <p>1. Create 66 man years low to medium income jobs for area residents during a 7-year period.</p> <p>2. Create 3 man years low to medium income employment in association with operation and maintenance of the works of improvement.</p> <p>3. Create regional income benefit distribution of \$311,600. Family incomes are distributed:</p> <table> <tbody> <tr> <td>Under \$3,000</td> <td>9%</td> </tr> <tr> <td>\$3,000 to \$10,000</td> <td>49%</td> </tr> <tr> <td>Over \$10,000</td> <td>42%</td> </tr> </tbody> </table> <p>It is assumed that benefits will be distributed at the following percentages:</p> <table> <tbody> <tr> <td>Under \$3,000</td> <td>10%</td> </tr> <tr> <td>\$3,000 to \$10,000</td> <td>55%</td> </tr> <tr> <td>Over \$10,000</td> <td>35%</td> </tr> </tbody> </table> <p>4. Local costs to be borne by the watershed region total \$63,700. Costs to be distributed by about the same ratio as benefits.</p> | Under \$3,000 | 9% | \$3,000 to \$10,000 | 49% | Over \$10,000 | 42% | Under \$3,000 | 10% | \$3,000 to \$10,000 | 55% | Over \$10,000 | 35% |  |
| Under \$3,000                  | 9%  |               |    |                     |     |               |     |               |     |                     |     |               |     |  |
| \$3,000 to \$10,000            | 49%   |               |    |                     |     |               |     |               |     |                     |     |               |     |  |
| Over \$10,000                  | 42%   |               |    |                     |     |               |     |               |     |                     |     |               |     |  |
| Under \$3,000                  | 10%   |               |    |                     |     |               |     |               |     |                     |     |               |     |  |
| \$3,000 to \$10,000            | 55%   |               |    |                     |     |               |     |               |     |                     |     |               |     |  |
| Over \$10,000                  | 35%   |               |    |                     |     |               |     |               |     |                     |     |               |     |  |
| B. Life, health, and safety    | <p>1. Reduce travel hazards experienced during floods.</p>  |               |    |                     |     |               |     |               |     |                     |     |               |     |  |
| C. Recreation opportunities    | <p>1. Create 50,000 recreation visits. About 11 percent of these will stem from outside the region.</p>   |               |    |                     |     |               |     |               |     |                     |     |               |     |  |

SELECTED PLAN  
ENVIRONMENTAL QUALITY ACCOUNT  
MIDDLE WALNUT WATERSHED, KANSAS

Components

Measure of effects

Beneficial and adverse effects

- |   |  |
|---|--|
| A. Open and green space, lakes, and other areas of natural beauty | <ol style="list-style-type: none"><li>1. Develop lake with 93 surface acres for water-based recreation open to the public.</li><li>2. Develop 239 acres for multi-purpose use including public recreation and open and green space.</li><li>3. Improve rural area beauty on 44,668 acres of agricultural land by the application of land treatment practices.</li><li>4. Increase traffic, litter, and noise in a sparsely populated rural community by 50,000 visitor days annually.</li><li>5. Fifteen reservoir structures will increase landscape diversity.</li></ol> |
|---|--|

## SELECTED PLAN

## ENVIRONMENTAL QUALITY ACCOUNT

## MIDDLE WALNUT WATERSHED, KANSAS

| <u>Components</u>                                | <u>Measure of effects</u>  |
|--|--|
| Beneficial and adverse effects                   |  |
| B. The quality of water, land, and air resources | <ol style="list-style-type: none"><li>1. Reduce flooding on 8,636 acres of flood plain land and 30,536 acres of Walnut River lands.</li><li>2. Reduce flood damage 59 percent.</li><li>3. Reduce delivery of sediment to the Walnut River from 106 to 59 acre feet annually.</li><li>4. Reduce average annual soil loss from 5.1 tons to 4.0 tons per acre.</li><li>5. Prolong stream flow following periods of above normal rainfall.</li><li>6. Reduce flood damages on 8,636 acres of flood plain land.</li></ol> |

## SELECTED PLAN

## ENVIRONMENTAL QUALITY ACCOUNT

## MIDDLE WALNUT WATERSHED, KANSAS

| <u>Components</u>  | <u>Measure of effects</u>   |
|--|---|
| Beneficial and adverse effects   |   |
| C. Archeological, historical, biological, and geological resources and selected ecological systems | <ol style="list-style-type: none"><li>1. Create water areas of 518 acres where waterfowl resting and feeding will occur.</li><li>2. Improve wildlife habitat through establishment of enhancement measures adjacent to structural measures.</li><li>3. Application of land treatment practices on 44,668 acres of agricultural land will generally improve wildlife habitat.</li><li>4. Create 518 acres of reservoir aquatic habitat.</li><li>5. Inundate 518 acres of terrestrial wildlife habitat.</li><li>6. Reduced use of 1,225 acres of terrestrial wildlife habitat during periodic inundation of reservoir flood pools.</li><li>7. The use of 167 acres of terrestrial wildlife habitat to be occupied by dams and spillways will be temporarily interrupted and partially lost.</li><li>8. Inundate 10.1 miles of intermittent stream channel habitat.</li><li>9. Maintain the multiple use benefits and forest ecosystem on 5,062 acres of woodland.</li></ol> |

## SELECTED PLAN

## ENVIRONMENTAL QUALITY ACCOUNT

## MIDDLE WALNUT WATERSHED, KANSAS

| <u>Components</u>                            | <u>Measure of effects</u>  |
|--|--|
| Beneficial and adverse effects               |  |
| D. Irreversible or irretrievable commitments | <ol style="list-style-type: none"><li>1. Commit 194 acres cropland, 232 acres rangeland and 92 acres woodland, to sediment and water supply pools.</li><li>2. Commit 82 acres cropland, 78 acres rangeland and 7 acres woodland to dams and spillways.</li><li>3. Commit 122 acres cropland, 62 acres rangeland and 10 acres woodland to recreation land.</li><li>4. Inundate 10.1 miles of intermittent stream.</li></ol> |

Middle Walnut Watershed

Butler, Cowley, Sedgwick, and Sumner Counties, Kansas

FINAL ENVIRONMENTAL IMPACT STATEMENT

Robert K. Griffin  
State Conservationist  
Soil Conservation Service

SPONSORING LOCAL ORGANIZATIONS

Middle Walnut Watershed Joint District No. 60  
Box 58  
Derby, Kansas 67037

Butler County Conservation District  
139 Oil Hill Road (USDA Bldg.)  
El Dorado, Kansas 67042

Cowley County Conservation District  
Box 626 (120 W. 12th Street)  
Winfield, Kansas 67156

Sedgwick County Conservation District  
4100 Maple  
Wichita, Kansas 67209

Sumner County Conservation District  
Room 106, Federal Building  
Wellington, Kansas 67152

City of Udall 67146

February 1976

Prepared by

UNITED STATES DEPARTMENT OF AGRICULTURE  
Soil Conservation Service  
760 South Broadway  
Salina, Kansas 67401



USDA ENVIRONMENTAL IMPACT STATEMENT

Middle Walnut Watershed Project

Butler, Cowley, Sedgwick, and Sumner Counties, Kansas

Prepared in Accordance with  
Sec. 102(2) (C) of P.L. 91-190

SUMMARY

- I Final
- II Soil Conservation Service
- III Administrative
- IV Description of Project Purpose and Action.

A project for watershed protection, flood prevention and public recreation in Butler, Cowley, Sedgwick and Sumner Counties, Kansas, to be implemented under authority of the Watershed Protection and Flood Prevention Act (P.L. 566, 83d Congress, 68 Stat. 666) as amended.

- V Summary of Environmental Impact.

Soil losses in the watershed will be reduced 22 percent. Floodwater and sedimentation damages will be reduced on 8,636 acres of flood plain land, 19,402 acres of Walnut River mainstem flood plain within the watershed, and 11,134 acres of Walnut River mainstem flood plain below the watershed boundary. There will be improvement in fire control capabilities on 52,591 acres and multiple use benefits on 850 acres of woodland. Floodwater retarding structures and the multipurpose reservoir will increase landscape diversity, improve fishery resources, and provide additional feeding and resting sites for waterfowl. There will be 332 acres, including a 93 acre reservoir, for public water based recreation and wildlife management. Rural area development will be advanced through increased farm incomes and employment opportunities, higher land values, decreased flood related expenses, and a more stable economy.

Agricultural use and terrestrial wildlife habitat use of 518 acres will be eliminated by sediment and beneficial use pools. Agricultural and terrestrial wildlife habitat uses will be interrupted and reduced on 1,225

acres by periodic flooding of reservoir retarding areas. Agricultural uses will be largely eliminated on 167 acres to be incorporated into dams and spillways. Terrestrial wildlife use of dams and spillways will be reduced until revegetation occurs. Woodland area totaling 99 acres and 10.1 miles of intermittent stream will be inundated permanently. Some timber can be left standing to provide fish habitat. An estimated 15 persons will be eligible for relocation payments. Traffic, litter, and noise will increase around the multipurpose reservoir.

VI Alternatives considered:

- A. Proposed project with dry pool storage
- B. Continuation of current trends (NO PROJECT)
- C. Accelerated land treatment only
- D. Tributary flood plain purchase and management
- E. Proposed project without the multipurpose structure
- F. Multipurpose Structure No. 4 only
- G. Multipurpose water supply structure
- H. Accelerated land treatment with flood plain zoning

VII Agencies from which written comments have been received.

Department of the Army  
Department of the Interior  
Department of Commerce  
Department of Health, Education, and Welfare  
Department of Transportation  
Environmental Protection Agency  
Advisory Council on Historic Preservation  
Governor of Kansas  
Division of State Planning and Research, Department of Administration, State of Kansas (Clearinghouse)  
State Historic Preservation Officer

VIII Draft statement transmitted to Council on Environmental Quality on December 4, 1975.

AUTHORITY

Installation of this project constitutes an administrative action. Federal assistance will be provided under authority of P. L. 83-566, 83d Congress, 68 Stat. 666, as amended.

SPONSORING LOCAL ORGANIZATIONS

Middle Walnut Watershed Joint District No. 60

Butler County Conservation District

Cowley County Conservation District

Sedgwick County Conservation District

Sumner County Conservation District

City of Udall

PROJECT PURPOSES AND GOALS

Seven original objectives were adopted by the Middle Walnut Watershed steering committee in October, 1962. These objectives were reaffirmed and expanded in the application for P.L. 566 assistance in 1965 and in the watershed district's general plan (required by state law). The refined objectives are stated below.

1. **Watershed Protection (conservation land treatment) -**

The watershed board wants to use water as efficiently as possible before it leaves the watershed and also use land within its capability. An effective land treatment system will aid efficient use of water because surface runoff will take longer to reach established drainageways. The land treatment program will also reduce erosion rates on the upland. Reduced erosion will increase efficiency and life of the structural measures. More than one-third of the cropland, one-eighth of the grassland, and one-eighth of the woodland should be adequately treated during the project installation period.

2. **Flood Prevention - Completion of major Corps of Engineers lakes and planned P.L. 566 watershed projects bordering the Middle Walnut Watershed on the north and east will provide adequate flood protection for the mainstem Walnut River flood plain.**

At least 50-year frequency protection is desired for roads and residential properties in the Four Mile Creek valley. A 60 percent overall reduction in average annual flood damage has been selected as a flood protection goal for other tributary valleys.

3. **Drainage and Irrigation -** Some areas within the watershed have inadequate drainage. They are generally located west of the Walnut River along the lower five miles of the watershed district. Landowners and operators have already completed most work necessary to minimize this problem. A project objective is to reduce the flow of excess surface water into the affected area by use of floodwater retarding structures. Irrigation is not a primary objective although incidental irrigational use is expected.

4. **Fish, Wildlife, and Recreation -** The watershed will encourage enhancement of wildlife habitat whenever possible. Enhancement of wildlife and recreational opportunities is desirable. Sponsors interested in recreational projects will be assisted by the board as much as possible.

5. Municipal and Industrial Water Supply - Municipal water supply, flood control and incidental use of stored water as a means of increasing urban and rural water supply will be investigated by the board. Should sponsors become available for water supply projects, the watershed board will cooperate as much as practicable.

#### PLANNED PROJECT

##### Land Treatment Measures

Resource management systems will be implemented on 33,622 acres of cropland, 10,196 acres of rangeland, and 850 acres of forestland.<sup>1/</sup>\* Fire control will be provided on 52,591 acres. The resource management systems will include all practices that are needed for the desired use of a particular land area.

Cropland is used primarily for the production of adapted, cultivated, and close-growing crops for harvest, alone or in association with seed crops. Basic conservation practices to be installed on cropland include conservation cropping systems, stubble mulching, minimum tillage, contour farming, and the installation of gradient terraces, diversions, and grassed waterways. See Appendix B for a description of individual conservation practices for all lands.

Rangeland is used for grazing livestock and big game animals. The natural plant community is dominated by grasses, grasslike plants, forbs, and shrubs. Primary practices available for brush management, range seeding, and stockwater pond and detention dam construction.

Woodland is used primarily to produce adapted wood species, to provide cover, to protect fields and farmsteads from inclement weather, and to supply watershed protection, wildlife habitat, and landscape diversity. Woodland treatment practices include woodland improvement systems, windbreak and shelterbelt planting and renovation, hedgerow replacement or renovation, fire protection, and special purpose plantings.

A forestry work plan<sup>2/</sup> was developed for Middle Walnut Watershed by the Kansas State and Extension Forester, cooperating with the Forest Service, USDA. Forestry technical assistance provided through the existing Cooperative Forest Management Program will adequately serve the needs of the watershed woodlands throughout the life of the project.

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\* See list of references.

An educational program is planned to inform rural residents of the economic and wildlife benefits gained by excluding livestock from woodland and shelterbelts.

The watershed area is protected by rural fire districts. Equipment procurement, training in fire fighting and control, and fire prevention education will be continued. Technical assistance for fire control measures will be provided by the Kansas State and Extension Forester through the Cooperative Fire Control Program. No additional funds are needed to maintain the desired level of fire protection which is 0.1 percent loss per year on woodlands and 0.5 percent loss on grasslands in this area.

Watershed directors and conservation district supervisors are assisting with installation of needed conservation practices. The watershed district has a field representative contacting individual landowners and operators to urge them to cooperate in establishing conservation practices on their farms. His duties include informing people of the watershed program and its progress. It is important for landowners and operators to understand that land treatment measures benefit them individually and are required before the structural phase of the watershed program can be installed.

The watershed district board estimates that land treatment measures can be completed within seven years.

#### Nonstructural Measures

Although no specific nonstructural measures are to be authorized by this plan, a program of flood plain management is underway as an indirect result of watershed activity. At the request of the watershed board, the Service, the Butler County Commission, and the state's Division of Water Resources cooperated to prepare a detailed "Flood Hazard Analysis"<sup>3</sup> for Four Mile and Eight Mile Creeks. Butler County is in the process of implementing zoning regulations based on this study. Butler County has also applied for flood insurance.

#### Structural Measures - Reservoir Type Structures

A system of 14 floodwater retarding structures and one multipurpose floodwater retarding and recreational water supply structure with recreational facilities will be installed at locations shown on the Project Map (Appendix E).

Principal spillways of all structures will be made of reinforced concrete or material of comparable quality and strength. Each spillway will have a single-stage inlet with an uncontrolled release. Release rates will vary from 15 to 44 cubic ft/sec/sq mi (csm), which will not exceed present downstream channel capacities. Natural streamflow is to be passed through the dams to meet downstream water rights as provided by the Kansas Water Appropriation Act. All structures will have drawdown works consisting of a pipe (minimum diameter 8 inches) with control valve installed at the bottom of the principal spillway. These works will permit releases regardless of reservoir storage elevation. A typical dam with a drop inlet principal spillway is shown in Appendix E.

All dams will be earth-fill structures with vegetated emergency spillways to release runoff safely past the dam when reservoir storage capacity and normal release rates are exceeded. In any one year the chance of operation of the emergency spillway at any given site is four percent or less.

Site Nos. 1, 2, 3, 4, 5, and 6 in the lower end of the watershed are underlain by rocks of the Chase Group. Site Nos. 7 through 15 in the upper end of the watershed are underlain by rocks of the Sumner Group. Principal spillways at all sites will be on yielding foundations.

At Site No. 4 the Paddock Shale Formation underlies the flood plain at an average depth of 10 feet, Herrington Limestone is found at depths of four to five feet in the abutments, and Hollenberg Limestone of the Sumner Group underlies the emergency spillway.

The depths of soils in the abutments of all sites range from three to five feet and are classified CL\*. Limestone, in thin residual beds, is found in the abutment soils of Site Nos. 4, 14, and 15. Soil depths in the valley floors of all sites range from four to twelve feet and consist of CL\* and GC\* materials. At Site Nos. 1, 3, 4, 5, 6, 8, and 9 the emergency spillway floors will be shale, while at Site Nos. 2, 7, 10, 11, 12, 13, 14, and 15 the emergency spillway floors will be soil. Costs for the emergency spillway at Site No. 5 include blasting of shale and limestone.

The main borrow area at all sites will be confined to the sediment and beneficial pools. Within the limits of material location and availability, the borrow areas will be shaped to allow optimum development for fishery resources. Borrow

material at Site Nos. 1, 4, 6, 7, 8, 9, 10, 11, 12, and 13 will be CL\*. The borrow at Site Nos. 2, 3, 5, 14, and 15 will be CL\* and GC\*.

The 15 structures will provide detention storage varying from 2.9 to 4.8 inches of runoff from their drainage areas. Runoff from 48.4 square miles, 16.4 percent of the watershed, will be controlled. The combined volume of retarding storage will be 10,466 acre feet with a combined surface area of 1,743 acres. Storage will be provided for the expected 100-year accumulation of sediment. Sediment storage volume equivalents vary from 0.56 to 1.20 inches per square mile of drainage area. Total sediment storage volume in all structures will be 2,193 acre feet. Surface area of the sediment and beneficial pools will be 518 acres. All sediment storage capacity will initially store water. The principal spillway crest of the 14 floodwater retarding structures will be placed at the elevation of the 100-year accumulation of sediment.

Multipurpose Structure No. 4 will provide 388 acre feet for recreation, 982 acre feet for floodwater detention, and 297 acre feet for sediment. The retarding pool will have a surface area of 152 acres. The recreational pool (93 acres) will be full 70 percent of the time. An 83-acre pool will be available 80 percent of the time. Ten acres will be exposed around the full pool shoreline 20 percent of the time. The pool will have a maximum initial depth of 19 feet and an average initial depth of 7.4 feet. Average depth at the end of the 100-year design life is expected to be 4.2 feet.

A total of 332 acres adjacent to Structure No. 4 will be purchased. This land includes 245 acres for the reservoir and 87 acres to insure full use of facilities. Flowage easements will be obtained on an additional 10 acres.

Facilities to be installed for full recreational use of Structure No. 4 will include landscaping, signs, access roads, parking areas, utilities, camping and picnicking sites, boat docks and ramps, sanitary and waste facilities, and a swimming beach. Facilities will be designed and installed to be usable by the physically handicapped. See Appendix C for discussion of specific facilities and quantities to be installed.

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\* Classification of Soils for Engineering Purposes, ASTM D24-87 (Laboratory), D24-88 (Field).

One area of the reservoir site will be specifically for wildlife habitat management. Only access roads, parking facilities, toilet facilities, erosion control measures, and a nature and fisherman trail will be installed in this area. The arrangement of recreational facilities and wildlife acres is shown on the Public Recreational Development Map (Appendix E).

Measures for fish and wildlife habitat will include: resting native pastures within the fee title area to assist in reestablishment; placing and maintaining tree and shrub plantings at recommended locations (in addition to those adjacent to the dam and spillway); leaving as much vegetation in the sediment and recreational pool as possible, constructing brush piles suitable for wildlife using trees cleared for construction; planting switchgrass within a 2-foot vertical elevation of the recreational pool; reseeding borrow areas to a quick cover crop; and fencing the entire fee title area.

Sponsors will provide public access to recreational facilities at the multipurpose reservoir. All recreational facilities at Structure No. 4 will be installed, operated, and maintained to meet or exceed the requirements of state and local public health agencies. HEW Standards will be used as guidelines. If the multipurpose reservoir is designated a "body contact area" by the Kansas State Board of Health, the city of Udall will be responsible for regular monitoring of water quality in the lake in accordance with the state code for Class A waters.<sup>26/</sup> This requirement does not prohibit use of the lake for body contact water sports prior to such designation.

Sediment pools in all the floodwater retarding structures will have some potential for limited recreational use. Access to these structure sites will be controlled by landowners. Access by the general public will be prohibited unless or until adequate sanitary facilities are provided to meet state and local health requirements. The watershed district will notify the State Department of Health and Environment if adequate sanitary facilities are not provided.

As a result of the acquisition of land for Structure No. 4, five farms involving 15 persons will be eligible for relocation payments. Relocation payments totaling \$12,500 are included in the estimated structural cost distribution for this site.

Specific measures to offset wildlife losses have been recommended for each structure site and have been accepted by sponsors. Enhancement measures have also been recommended. Maps and descriptions of these measures are included in the U.S. Fish and Wildlife Service letter report for this watershed.<sup>5/</sup>

Recommended measures to minimize wildlife losses have been adopted as design features for each structure and include: fencing the dam and planting a grass-legume mixture suitable for wildlife at each structure; odd areas to be within the fenced area for Structure Nos. 1, 4, 5, 6, 7, 8, 12, 13, and 15; making tree and shrub plantings at Structure Nos. 1, 3, 4, 5, 6, 7, 8, 9, 12, 13, and 15; constructing brush piles at Structure Nos. 1, 3, 4, 5, 6, 7, 9, 12, 13, 14, and 15; and preservation of existing trees below the dam at Structure No. 2.

Enhancement measures are not included as specific requirements for individual structures and are not included as project measures. These recommendations may be installed by the sponsors or landowners during or after the construction of project measures. Enhancement recommendations for structures include; leaving unharvested feed grains on field borders for wildlife food; leaving as much woody vegetation within sediment and water supply pools as possible; installing wood duck nesting boxes; seeding cropland within a four-foot (two-foot at Structure No. 4) vertical elevation of the sediment and water supply pools to switchgrass; installing unchecked overflow measures to provide intermittent stream flow; avoiding tree clearing above sediment and water supply pools; and brush pile construction.

In some cases, public utilities, farm operations, and roads will conflict with structure locations. The installation of Structure Nos. 5, 6, 7, 12, 14, and 15 will require modification of existing roads. Modification includes closing the road or properly reconstructing it to a line and grade above the functional limits of the structure. Installation of Structure Nos. 7, 8, 9, 12, and 15 will include diking around farmsteads and buildings. Utility modifications will be required for installation of Structure No. 12. None of the structures affect pipelines or mineral deposits. A record search by the State Corporation Commission and field investigations by the district revealed two abandoned oil wells which are improperly plugged. These wells involve Structure Nos. 3 and 12 and will be replugged at the time of construction.

The need for water and air pollution abatement during construction will be determined on a site-by-site basis. Abatement measures may include dry stream crossings, temporary vegetative establishment, watering for dust control, controlled burning, and sediment control basins.

The Soil Conservation Service will in consultation with the State Historic Preservation Officer maintain close communication with the State Archeologist during project construction so that any finds may be investigated to determine the need for emergency salvage. The National Park Service will also be notified of any discoveries. If necessary, the Secretary of the Interior will be asked to determine the site's eligibility for inclusion on the National Register. The Advisory Council on Historic Preservation will be requested to comment on any site affected by project activities which have the qualities to make it eligible for inclusion in the National Register of Historic Places. This is in accordance with section 106 of the National Historic Preservation Act, PL-89-665, 16 USC 470(f). Since this is a federally assisted local project, there will be no change in the existing responsibilities of any federal agency under Executive Order 11593 with respect to archeological and historical resources.

#### Project Costs

Total project installation cost will be \$7,647,500 of which P.L. 566 funds will pay \$2,985,900. Other sources will pay the remaining \$4,661,600. Total construction cost will be \$1,887,700; of this \$1,771,000 will be paid by P.L. 566 and \$116,700 will be paid by other sources.

#### WATERSHED RESOURCES - ENVIRONMENTAL SETTING

##### Physical Resources

Middle Walnut Watershed is located in south-central Kansas. Total area within the watershed is 188,947 acres. There are 92,092 acres in Butler County, 70,149 acres in Cowley County, 26,374 acres in Sedgwick County, and 332 acres in Sumner County. The watershed is bounded on the north by the Whitewater River Watershed, and on the northeast by the Upper Walnut River Watershed, and on the east by Little Walnut-Hickory, Muddy Creek, Rock Creek, and Timber Creek Watersheds. Middle Walnut Watershed comprises 15 percent of the 1,955 square miles in the Walnut River basin.

The Walnut River heads near Cassoday in Butler County, flows toward the southwest, and enters the Middle Walnut Watershed near Augusta as an unmodified perennial stream. It continues generally south across the eastern part of the watershed for approximately 60 channel miles and leaves the watershed near the north edge of Winfield. An estimated 170 miles of unmodified intermittent streams within the watershed are tributaries to the Walnut River. These intermittent streams include right bank tributaries Four Mile, Eight Mile, Polecat, Stewart, Crooked, and Spring Creeks; and left bank tributaries Sanford, Little Dutch, Foos, and Lone Elm Creeks. Four hundred forty-two farm ponds are distributed throughout the watershed.

There is no "wetland" within the watershed extensive enough to be included in the U.S. Fish and Wildlife Service's wetland survey.<sup>6/</sup>

Middle Walnut Watershed is located in the Arkansas River Basin in the Kansas subregion of the Arkansas-White-Red water resources region.<sup>7/</sup>

The western fourth of the watershed is underlain by rock of the Sumner Group predominantly shale but also includes deposits of dolomite, limestone, gypsum, and anhydrite. The eastern portion of the watershed is influenced primarily by the Chase Group of Permian Age.<sup>25/</sup> Winfield and Fort Riley Limestones are the dominant bedrock exposures. These limestones vary from 30 to 50 feet in thickness and exert considerable influence on the soils and topography of the area. Topography throughout the watershed is gently rolling to nearly flat.

Soils occupying uplands within the watershed occur as two significant soil association areas. Soils of the Irwin and Ladysmith series comprise the larger association and are on broad, nearly level to sloping divides throughout the area. These soils are dark, deep, moderately-well drained to somewhat poorly drained and have silty clay loam surface layers over slowly permeable silty clay subsoils. Soils of the Goessel and Rose Hill series comprise the less extensive association which occurs mostly in the northwestern part of the watershed on nearly level to gentle slopes. Goessel soils are moderately well drained and deep. Rose Hill soils are well drained and moderately deep over shaly clay. Both soils have dark silty clay surface layers over slowly permeable silty clay or clay subsoils.

Soils in the stream valleys are of the Verdigris, Norge and Brewer series. Verdigris and Brewer soils occupy the lower flood plain and Norge soils are on the rarely flooded terraces. Verdigris soils are the most extensive. They are deep, dark, well-drained soils with silt loam surface layers and moderately permeable silt loam subsoils. Brewer and Norge soils are about equal in extent and both are deep and dark colored. Brewer soils are moderately well drained and have silty clay loam surface layers over slowly permeable silty clay subsoils. Norge soils are well drained and have silt loam surface layers over moderately permeable silty clay loam subsoils.

Detailed soil surveys are available for the Butler, Sedgwick, and Sumner County parts of the watershed. The Cowley County part

will be completed in 1976. Butler County has the survey published. The other surveys are available in the SCS field offices in each county.

Weather is dominated by alternate masses of warm, moist air moving north from the Gulf of Mexico and masses of cold, comparatively dry air moving south from the polar regions. Areas, called the "horse latitudes," affected by this pattern are subject to frequent and abrupt weather changes. High intensity storms of short duration are common. They often cause flash floods in summer and sometimes cause blizzards in winter. Flash flood watch and warning services are available to watershed residents through the National Weather Service. The watershed also has frequent droughts. Normal annual precipitation, a 20-year average, is 31.5 inches. The most precipitation received in one year was 44.5 inches. The minimum was 12.15 inches. Seventy percent of the yearly precipitation usually comes during the 6-month growing season 195 days from April through September. Recorded temperature extremes are 117 and -28° F. Average minimum January and maximum July temperatures are 22 and 93° F respectively.9/

Shallow wells in the principal valleys yield sufficient water for household and stockwater use. Groundwater supplies on the upland are uncertain and well yields are small. Sedgwick County Rural Water District No. 1 presently supplies water to the extreme northwest corner of the watershed. Four rural water districts are organizing. When operational, they will supply water to part of the watershed. The cities of Rose Hill and Udall obtain their water from wells. The 442 existing farm ponds are the major source of livestock water.

The Kansas Department of Health and Environment and the U. S. Geological Survey have made chemical analyses at Augusta, Douglass, and Winfield on the Walnut River since 1963.10/ However, only a few selective water quality analyses have been made within the watershed on tributaries to the Walnut River. The majority of these analyses were made on Eight Mile Creek. The table on page II-14 displays selected water quality data at Augusta on the Walnut River and water quality data for selective samples on Eight Mile Creek. Comparison of this data reveals significantly higher sodium and chloride concentrations in the Augusta samples and significantly higher calcium, magnesium, and sulfate concentrations in the Eight Mile Creek samples. The waters of Eight Mile Creek and the Walnut River can be classified respectively as calcium sulfate and calcium chloride bicarbonate types.

## CHEMICAL ANALYSES OF STREAMFLOW - WALNUT RIVER AT AUGUSTA AND EIGHT MILE CREEK

Concentrations (mg/l)

III-14

| Location & Significance    | Date       | Discharge (cfs) | SiO <sub>2</sub> | Fe <sup>++</sup> | Cat <sup>+</sup> | Mg <sup>++</sup> | Na <sup>+</sup> | K <sup>+</sup> | HCO <sub>3</sub> <sup>-</sup> | CO <sub>3</sub> <sup>=</sup> | SO <sub>4</sub> <sup>-</sup> | Cl <sup>-</sup> | F <sup>-</sup> | NO <sub>3</sub> <sup>-</sup> | PO <sub>4</sub> <sup>-</sup> | B    | Dissolved Solids Residue Meas. | Dissolved Solids Residue Calc. | Ratio Dissolved Solids to Specific Conductance | Specific Conductance | pH      |  |
|----------------------------|------------|-----------------|------------------|------------------|------------------|------------------|-----------------|----------------|-------------------------------|------------------------------|------------------------------|-----------------|----------------|------------------------------|------------------------------|------|--------------------------------|--------------------------------|--|----------------------|---------|--|
| AUGUSTA                    | <u>10/</u> |                 |                  |                  |                  |                  |                 |                |                               |                              |                              |                 |                |                              |                              |      |                                |                                |  |                      |         |  |
| Highest Discharge          | 11-11-64   | 13000.00        | -                | 19               | 3.0              | 14               | 78              | -              | 12.0                          | 10.0                         | -                            | -               | -              | -                            | -                            | -    | 96                             | 107                            | 0.89   | 120                  | -       |  |
| Lowest Discharge           | 5-20-64    | 1.80            | 0.5              | 0.03             | 115              | 25.0             | 360             | 8.8            | 188                           | 0                            | 91.0                         | 670.0           | 0.7            | 1.8                          | -                            | -    | 127.8                          | 137.0                          | 0.53   | 2600                 | 7.4     |  |
| Highest TDS                | 1-20-67    | 8.50            | 14.0             | -                | 158              | 33.0             | 470             | 13.0           | 264                           | 0                            | 299.0                        | 750.0           | 1.4            | 34.0                         | -                            | -    | 1852                           | 1860                           | 0.60   | 3110                 | 7.8     |  |
| Lowest TDS                 | 10-17-64   | 9.8             | 6.20             | -                | 18               | 2.2              | 11              | 4.2            | 78                            | 0                            | 5.8                          | 9.0             | 0.3            | 1.5                          | -                            | -    | 100                            | 90                             | 0.64   | 110                  | 7.5     |  |
| Av. Concentrations & Disc. | 1963-1974  | 544.00          | 8.0              | 0.08             | 86               | 16.7             | 153             | 5.4            | 236                           | 0                            | 62.3                         | 241.6           | 0.7            | 4.0                          | -                            | -    | 695                            | 696                            | 0.57   | 12.5                 | 6.9-8.4 |  |
| Selected TDS               | 3-23-65    | 192.00          | 10.0             | -                | 74               | 17.0             | 84              | 3.8            | 229                           | 0                            | 31.0                         | 152.0           | 0.4            | 4.9                          | -                            | -    | 490                            | 504                            | 0.59   | 850                  | 7.8     |  |
| Selected TDS               | 10-3-72    | 1.10            | 9.0              | -                | 230              | 60.0             | 440             | 7.6            | 300                           | 0                            | 310.0                        | 850.0           | 0.4            | 0.4                          | -                            | -    | 2095                           | 2100                           | 0.57   | 3690                 | 7.0     |  |
| Selected TDS               | 3-12-68    | 45.00           | 6.2              | -                | 123              | 21.0             | 210             | 5.0            | 322                           | 0                            | 55.0                         | 366.0           | 0.5            | 4.9                          | 1.7                          | -    | 975                            | 1010                           | 0.55   | 1850                 | 7.7     |  |
| Selected TDS               | 8-13-64    | 6.20            | 1.1              | -                | 80               | 27.0             | 279             | 8.8            | 156                           | 0                            | 66.0                         | 515.0           | 1.1            | 0.8                          | -                            | -    | 1056                           | 1060                           | 0.51   | 1980                 | 7.2     |  |
| Av. Selected Conc. & Disc. | -          | 61.08           | 6.6              | -                | 127              | 32.0             | 253             | 6.3            | 252                           | 0                            | 115.5                        | 455.8           | 0.6            | 2.8                          | -                            | -    | 1154                           | 1168                           | 0.56   | 2092                 | 7.2-7.8 |  |
| EIGHT MILE CREEK           |            |                 |                  |                  |                  |                  |                 |                |                               |                              |                              |                 |                |                              |                              |      |                                |                                |  |                      |         |  |
| Sample Site 33*            | 8-2-63     | 0.62            | 16.0             | -                | 491              | 65.0             | 56              | 4.9            | 327                           | 0                            | 1207.0                       | 52.0            | 0.9            | 4.4                          | 0.4                          | 0.51 | 2058                           | -                              | 0.83   | 2480                 | 7.4     |  |
| Sample Site 34             | 8-2-63     | 0.74            | 12.0             | -                | 382              | 60.0             | 46              | 8.1            | 271                           | 0                            | 976.0                        | 45.0            | 0.8            | 2.7                          | 0.3                          | 0.41 | 1667                           | -                              | 0.80   | 2080                 | 7.7     |  |
| Sample Site 25             | 8-2-63     | 1.01            | 12.0             | -                | 214              | 52.0             | 30              | 6.9            | 285                           | 0                            | 510.0                        | 28.0            | 0.5            | 5.8                          | 0.4                          | 0.27 | 1000                           | -                              | 0.72   | 1390                 | 7.7     |  |
| Sample Site 36             | 8-2-63     | 2.05            | 13.0             | -                | 131              | 32.0             | 21              | 9.6            | 229                           | 0                            | 266.0                        | 23.0            | 0.5            | 4.4                          | 0.4                          | 0.15 | 613                            | -                              | 0.65   | 940                  | 7.5     |  |
| Sample Site 37             | 8-2-63     | 1.32            | 12.0             | -                | 101              | 23.0             | 18              | 8.1            | 166                           | 0                            | 213.0                        | 18.0            | 0.5            | 4.4                          | 0.8                          | 0.13 | 481                            | -                              | 0.65   | 740                  | 7.5     |  |
| SCS High Flow**            | 6-17-75    | 880.00          | -                | -                | 19               | 3.8              | -               | -              | 29                            | 0                            | 17.0                         | 30.0            | -              | 0.7                          | 0.2                          | -    | 299                            | -                              | -  | -                    | 7.6     |  |
| SCS Low Flow               | 7-10-75    | No flow         | -                | -                | 89               | 3.6              | -               | -              | 320                           | 0                            | 140.0                        | 50.0            | -              | 0.7                          | 4.7                          | -    | 577                            | -                              | -  | -                    | 8.1     |  |

\* USGS

R. B. Leonard  
Chemical Quality of Water in the Walnut River Basin (unpublished)

\*\* Upstream of Sample Site 23.

Sample numbers increase downstream.  
Site 33 below tributary carrying treated effluent.

For the period of record, 1963-1974, current surface water criteria recommendations were exceeded at the Augusta station for concentrations of total dissolved solids and chloride, fluoride, nitrate, and sulfate ions. Measurements of total dissolved solid concentrations commonly exceed recommended criteria. Chloride ion concentrations in excess of recommended criteria were measured during each year 1963-1973. Sulfate ion concentrations in excess of recommended criteria were frequently measured during 1964 and 1965.

Other measured concentrations in excess of recommended criteria were nitrate ion 12-5-63, and 1-16-64; and fluoride ion 3-13-64, 9-17-66, 11-30-66, 9-11-70, 8-17-72, 8-28-74, and 9-20-74. The carbonate ion was measurable in only two analyses. The pH at the time of these two occurrences was 8.5, 12-21-65, and 8.4, 3-6-69.

For the selective samples taken from Eight Mile Creek, only total dissolved solids and sulfate concentrations exceeded current drinking water quality criteria. These excesses may be due to natural or man-made effluents. High sulfate and calcium ion concentrations occur in natural ground water effluent. The natural source of the sulfate and calcium ions is gypsum ( $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$ ) and anhydrite ( $\text{CaSO}_4$ ) beds in the Wellington Formation. 25/ Treated sewage released in a tributary just above sample Site 33, displayed on the table on the preceding page, may also be a source of excessive sulfate concentrations. The paucity of oil well operations within the watershed supports the low recorded chloride concentrations. In the watershed tributaries and the Walnut River, nitrate as nitrogen exceeds recommended limits to control growth of plants. However, excessive plant growths have only been noted in stagnated pools in the upper reaches of the watershed tributaries. Nitrogen and phosphorous fertilizer applications for Butler County were 5,896 and 1,417 tons respectively in 1970, for Cowley County they were 3,556 and 1,906 tons respectively.

The average nutrient yields of nitrogen and phosphate are respectively 0.10 pounds of nitrogen and 0.05 pounds of phosphate per cfs per square mile per year in the Walnut River Basin. 27/

Five feedlots are located within the watershed. The Kansas State Board of Health and Environment recommended waste treatment facilities for two feedlots. The facilities for these two feedlots have been completed but have not yet been checked for effectiveness. The Kansas Forestry, Fish and Game Commission

blamed feedlot runoff for a fish kill in August of 1969 on Four Mile Creek. Bacterial density estimates have been made by the Kansas State Board of Health at the Augusta and Winfield stations and by consultants hired by SCS at a selected station on Eight Mile Creek. The maximum and minimum bacterial density estimates at the Augusta station and bacterial density estimates at the SCS selected station on Eight Mile Creek are displayed below.

Augusta Station  
Max. - March, 1971      Min. - October, 1962

|                    |       |              |
|--------------------|-------|--------------|
| Total Coli/100 ml  | 6,100 | 430          |
| Fecal Coli/100 ml  | 240   | Less than 10 |
| Fecal Strep/100 ml | 530   | 50           |

SCS Eight Mile Creek Station  
June 17, 1975                  July 10, 1975

|                    |          |      |
|--------------------|----------|------|
| Total Coli/100 ml  | 5,075    | 467  |
| Fecal Coli/100 ml  | Bad test | 83   |
| Fecal Strep/100 ml | N.M.     | N.M. |

Two turbidity measurements were made at the selected SCS station on Eight Mile Creek. A value of 500 JTU's was recorded June 17, 1975, at a discharge of 880 cfs and a value of 18 JTU's was recorded July 10, 1975 under a no-flow condition. The calculated average annual suspended sediment concentrations for Eight Mile Creek is 1600 mg/l, while the average suspended sediment concentration at the Winfield station for the interval 1963 to 1974 calculated 1061 mg/l.

Mineral deposits in the watershed include petroleum and natural gas. Major oil activity occurs along the eastern edge of the district. Oil and gas lines cross the watershed in several places. There are four rock quarries within the watershed. Three are south of Augusta, on the east side of the Walnut River, and one is three miles east of Udall. Six small sand and gravel pits are located within the watershed. Some of the watershed area may have potential for chemical or metallurgical limestone. None of these resources will be affected by installation of the works of improvement proposed in the plan.

#### Present and Projected Population

There were 424,364 people living in Butler, Cowley, and Sedgwick Counties in 1970. The projected population for these counties is 551,700 people by 1980 and 850,000 by 2020.

Total population within the watershed in 1972 was estimated at 37,496. Of this total, 31,531 was urban and 5,965 was rural. By 1980 the watershed population is projected to be 46,000 and by 2020 it is projected to be 73,000. Most of the urban population was near the Wichita (population 276,553) metropolitan area in the northwest part of the watershed. The greater metropolitan area includes Andover, 1,880; Prairie Village, Greenwich Heights, Windsor Park, Lakeside Acres, and Park East. Other communities which service the watershed area are Rose Hill, 387, in the west-central area; and Douglass, 1,126, in the east-central area. These small communities could increase rapidly in population because of Wichita metropolitan area influence. Just outside the watershed are Augusta, 5,977, to the northeast; Winfield, 11,405, to the south; and Udall, 668, to the southwest.

#### Economic Resources

All land within the watershed is privately owned except for roads and city properties.

All or part of 1,050 farming units, or portions thereof, averaging 180 acres in size are within the watershed. Approximately 80 percent of the farms are owner operated. Farms tend to be smaller than in nearby areas due to the large number of operators working at full-time jobs in Wichita. The number of farms in the watershed is remaining fairly constant. This is because farms close to Wichita are being subdivided and sold to urban residents wanting to live on a small farm. This trend offsets the amalgamation of smaller farms by larger operators in areas of the watershed more distant from Wichita.

Most farms in the watershed are diversified. Wheat, sorghums, alfalfa, and soybeans are the principal cultivated crops on both the upland and bottomland. Much of the sorghum and alfalfa is marketed through livestock.

Land use in the watershed is as follows:

| <u>Land Use</u> | <u>Tributary Acres</u> | <u>Flood Plain Percent</u> | <u>Watershed Total</u> | <u>Percent</u> |
|-----------------|------------------------|----------------------------|------------------------|----------------|
| Cropland        | 7,417                  | 86                         | 90,188                 | 48             |
| Grassland       | 575                    | 7                          | 81,555                 | 43             |
| Forestland      | 526                    | 6                          | 5,265                  | 3              |
| Other Land      | 118                    | 1                          | 11,939                 | 6              |
| <b>Total</b>    | <b>8,636</b>           | <b>100</b>                 | <b>188,947</b>         | <b>100</b>     |

Gross production for composite acres varied between reaches from \$121 to \$179 based on WRC current prices issued October, 1974. The variance was due mainly to percentages of rangeland. Current agricultural land values for all areas except Four Mile Creek are \$375 per acre for upland cropland, \$600 per acre for bottomland cropland, and \$200 per acre for grassland. In upper reaches of Four Mile Creek near Wichita, land values are \$1,500 per acre; in the lower reaches they are \$600 per acre. This data was provided by the sponsors.

Projected crop yields for the year 2000 are shown as follows:

| <u>Crop</u>    | <u>Unit</u> | <u>Butler<br/>County</u> | <u>Flood Plain</u>         |                         |
|----------------|-------------|--------------------------|----------------------------|-------------------------|
|                |             |                          | <u>Without<br/>Project</u> | <u>With<br/>Project</u> |
| Wheat          | bu          | 46                       | 49                         | 56                      |
| Grain sorghum  | bu          | 69                       | 117                        | 134                     |
| Sorghum silage | T.          | 19.3                     | 27                         | 31                      |
| Corn silage    | T.          | 10                       | 16                         | 19                      |
| Alfalfa        | T.          | 4.5                      | 6.7                        | 7.2                     |
| Soybeans       | bu          | 34                       | 58                         | 65                      |
| Tame pasture   | #           | -                        | 324                        | 373                     |

The watershed is grided by a system of secondary roads which lead to U.S. Highways 54, 77, 160, and Kansas Highways 15 and 96 and the Kansas Turnpike. The St. Louis and San Francisco; and the Atchison, Topeka and Santa Fe Railroads service the watershed. These transportation facilities offer excellent marketing opportunities.

Markets exist for most species of native trees in this area. Black walnut and bur oak are especially marketable because of their scarcity. Most woodland has been depleted of better quality trees, hence woodlands have large quantities of inferior trees. An increase in value of woodlands for wildlife habitat, recreation, and roundwood products is expected as population increases and new markets develop.

Reduced government contracting in the aircraft industry has led to a high rate of unemployment in Wichita and surrounding areas at times. In July, 1970, the unemployment rate rose to more than 11 percent. Sedgwick and Butler Counties were designated as an economic redevelopment area eligible for benefits under the Economic Development Act of 1965. In 1970, the unemployed labor force for the state was 3.9 percent. During this time the unemployment rate for the watershed area counties was Butler,

6.3 percent; Cowley, 4.7 percent; and Sedgwick, 7.2 percent. The median year of schooling attained for persons over 25 years was Butler, 12.3; Cowley, 12.2; and Sedgwick, 12.4. This compares to 12.3 for the state.<sup>4/</sup>

There are two resource conservation and development (RC&D) projects near the watershed. The Sunflower RC&D Project lies to the west and includes a small acreage of the watershed. The Flint Hills RC&D Project lies north of the watershed approximately 25 miles.

#### Plant and Animal Resources

This watershed lies in the western edge of the Bluestem (Tall Grass Prairie) region of Kansas.<sup>8/</sup> Common native plants<sup>12/</sup> include:

|                        |                                 |
|------------------------|---------------------------------|
| Big bluestem           | <u>Andropogon gerardii</u>      |
| Little bluestem        | <u>Andropogon scoparius</u>     |
| Indiangrass            | <u>Sorghastrum nutans</u>       |
| Switchgrass            | <u>Panicum virgatum</u>         |
| Tall dropseed          | <u>Sporobolus asper</u>         |
| Sideoats grama         | <u>Bouteloua curtipendula</u>   |
| Blue grama             | <u>Bouteloua gracilis</u>       |
| Hairy grama            | <u>Bouteloua hirsuta</u>        |
| Purpletop              | <u>Tridens flavus</u>           |
| Silver bluestem        | <u>Andropogon saccharioides</u> |
| Western ragweed        | <u>Ambrosia psilostachya</u>    |
| Missouri goldenrod     | <u>Solidago missouriensis</u>   |
| Baldwin ironweed       | <u>Vernonia baldwinii</u>       |
| Louisiana sagewort     | <u>Artemisia ludoviciana</u>    |
| Mountain mint          | <u>Pycnanthemum spp.</u>        |
| Leadplant              | <u>Amorpha canescens</u>        |
| Catclaw sensitivebrier | <u>Schrankia nuttallii</u>      |
| Prairie clovers        | <u>Pentalostimum spp.</u>       |
| Manyflowered scurfpea  | <u>Psoralea tenuiflora</u>      |
| Compass plant          | <u>Silphium laciniatum</u>      |
| Perennial sunflowers   | <u>Helianthus spp.</u>          |

Some smooth brome grass and Kentucky 31 fescue are used for tame pastures. Buckbrush (Symporicarpos orbiculatus) and smooth sumac (Rhus glabra) are invading brushy plants. Honeylocust, cedar, and osageorange may invade poorly managed pastures and ranges. Chemical treatment is used to control brush and undesirable trees. After treatment, recovery of native grass is usually rapid but must be followed by careful management to maintain good species composition.

There are 5,265 acres of woodland, all of which is privately owned. Most woodland is on alluvial soil along the Walnut River and its tributaries. Woodlands are generally uniform in age and moderately stocked. Sawlog quality and marketability are only fair.

Species most commonly found on the bottomland sites include:

|              |                              |
|--------------|------------------------------|
| Hackberry    | <u>Celtis occidentalis</u>   |
| White Ash    | <u>Fraxinus americana</u>    |
| Honeylocust  | <u>Gleditsia triacanthos</u> |
| Black Walnut | <u>Juglans nigra</u>         |
| Bur Oak      | <u>Quercus macrocarpa</u>    |
| American Elm | <u>Ulmus americana</u>       |
| Cottonwood   | <u>Populus deltoides</u>     |
| Box Elder    | <u>Acer negundo</u>          |
| Willow       | <u>Salix spp.</u>            |
| Osageorange  | <u>Maclura pomifera</u>      |
| Redcedar     | <u>Juniperus virginiana</u>  |

There are over 30 miles of shelterbelts, 400 miles of osageorange hedgerows, and 100 farmstead windbreaks.

Fishing is available in the Walnut River, lower portions of major tributaries, and farm ponds. Principal fishes<sup>13</sup> in the project area include:

|                    |                               |
|--------------------|-------------------------------|
| Bluntnose minnow   | <u>Pimephales notatus</u>     |
| Suckermouth minnow | <u>Phenacobius mirabilis</u>  |
| Sand shiner        | <u>Notropis stramineus</u>    |
| Gizzard shad       | <u>Dorosoma cepedianum</u>    |
| Carp               | <u>Cyprinus carpio</u>        |
| Red shiner         | <u>Notropis lutrensis</u>     |
| Redfin shiner      | <u>Notropis umbratilis</u>    |
| Smallmouth buffalo | <u>Ictiobus bubalus</u>       |
| Channel catfish    | <u>Ictalurus punctatus</u>    |
| Black bullhead     | <u>Ictalurus melas</u>        |
| Flathead catfish   | <u>Pylodictus olivaris</u>    |
| Largemouth bass    | <u>Micropterus salmoides</u>  |
| Bluegill           | <u>Lepomis macrochirus</u>    |
| Black crappie      | <u>Pomoxis nigromaculatus</u> |
| Freshwater drum    | <u>Aplodinotus grunniens</u>  |
| Stoneroller        | <u>Campostema anomalum</u>    |

Many of the farm ponds have been stocked with combinations of largemouth bass, bluegill, channel catfish, and other species. Fishing in these ponds ranges from poor to excellent. Butler

and Cowley State Fishing Lakes, Lakes El Dorado and Bluestem, Augusta City Lake, and Fall River, Toronto, and Cheney Reservoirs are located close enough to the watershed to provide some public fishing to local residents.

Upland game species inhabiting the watershed include bobwhite quail, greater prairie chicken, mourning dove, ring-necked pheasant, fox squirrel, and cottontail rabbit. Common fur bearing animals include mink, beaver, muskrat, fox, raccoon, skunk, and coyote.

Upland game hunting, particularly for quail, is significant throughout the area. Waterfowl habitat and hunting opportunity exists along the Walnut River, streams, farm ponds, and several nearby lakes outside the watershed. Deer hunting, based on permit drawings, occurs in the watershed. Raccoon and coyote hunting with dogs is a popular sport.

Some of the more common mammals<sup>14/</sup> in the area include:

|                                   |                                      |
|-----------------------------------|--------------------------------------|
| Coyote                            | <u>Canis latrans</u>                 |
| Beaver                            | <u>Castor canadensis</u>             |
| Opossum                           | <u>Didelphis marsupialis</u>         |
| Black-tailed jackrabbit           | <u>Lepus californicus</u>            |
| Striped skunk                     | <u>Mephitis mephitis</u>             |
| House mouse                       | <u>Mus musculus</u>                  |
| Mink                              | <u>Mustella vison</u>                |
| White-tailed deer                 | <u>Odocoileus virginianus</u>        |
| Muskrat                           | <u>Ondatra zibethicus</u>            |
| Deer mouse                        | <u>Peromyscus maniculatus</u>        |
| Raccoon                           | <u>Procyon lotor</u>                 |
| Norway rat                        | <u>Rattus norvegicus</u>             |
| Fox squirrel                      | <u>Sciurus niger</u>                 |
| Thirteen-lined<br>ground squirrel | <u>Spermophilus tridecemlineatus</u> |
| Eastern cottontail                | <u>Sylvilagus floridanus</u>         |

There are many birds present in the watershed. Following is a partial list of more common representatives:<sup>15/</sup>

|                      |                              |
|----------------------|------------------------------|
| Red-winged blackbird | <u>Agelaius phoeniceus</u>   |
| Great blue heron     | <u>Ardea herodias</u>        |
| Red-tailed hawk      | <u>Buteo jamaicensis</u>     |
| Bobwhite             | <u>Colinus virginianus</u>   |
| Common crow          | <u>Corvus brachyrhynchos</u> |
| Blue jay             | <u>Cyanocitta cristata</u>   |

|                      |                              |
|----------------------|------------------------------|
| Downy woodpecker     | <u>Dendrocopos pubescens</u> |
| Barn swallow         | <u>Hirundo rustica</u>       |
| Baltimore oriole     | <u>Icterus galbula</u>       |
| Oregon Junco         | <u>Junco oreganus</u>        |
| House sparrow        | <u>Passer domesticus</u>     |
| Ring-necked pheasant | <u>Phasianus colchicus</u>   |
| Eastern meadowlark   | <u>Sturnella magna</u>       |
| Starling             | <u>Sturnus vulgaris</u>      |
| Brown thrasher       | <u>Toxostoma rufum</u>       |
| Mourning dove        | <u>Zenaidura macroura</u>    |

Common amphibians and reptiles<sup>16/</sup> include:

#### Amphibians

Barred tiger salamander  
Great plains toad  
Western chorus frog  
Bullfrog

Ambystoma tigrinum  
Bufo cognatus  
Pseudacris triseriata  
Rana catesbeiana

#### Turtles

Northern snapping turtle  
Eastern ornate box turtle  
Western spiny softshell  
turtle

Chelydra serpentina  
Terrapene ornata  
Trionyx spiniferus

#### Lizards

Great plains skink  
Texas horned lizard

Eumeces obsoletus  
Phrynosoma cornutum

#### Snakes

Copperhead snake  
Prairie ringneck snake  
Plains hognose snake  
Western milk snake  
Diamond-backed water snake  
Western massasauga rattle  
snake  
Red-sided garter snake

Agkistrodon contortrix  
Diadophis punctatus  
Heterodon nasicus  
Lampropeltis triangulum  
Natrix rhombifera  
Sistrurus catenatus  
Thamnophis sirtalis

Endangered and threatened species have not been identified within the watershed. Several species could be present.

The Kansas Academy of Science<sup>17/</sup> lists the peregrine falcon (Falco peregrinus) and the whooping crane (Grus americana) as endangered species that may be found in this area. The bald eagle (Haliaeetus leucocephalus), prairie falcon (Falco mexicanus),

and burrowing owl (Speotyto cunicularia) are listed as threatened species that may be found in the area. The greater prairie chicken (Tympanuchus cupido pinnatus) is listed as needing special consideration to insure continued survival. The prairie chicken is found in the watershed.

There are no known endangered or threatened species of fish within the watershed.

There are no known endangered or threatened species of reptiles within the watershed. The Texas horned lizard (Phrynosoma cornutum) and the milk snake (Lampropeltis triangulum) are listed as needing special protection to assure continued survival.

Published lists of endangered and threatened mammals and amphibians do not include any species that may be found in the watershed.

The Academy has not published a list of endangered and threatened plants, but one is currently being developed. Mead milkweed, (Asclepias meadii) is the only plant tentatively listed that may occur in this area.

#### Recreational Resources

Recreational facilities on the major federal reservoirs (Cheney, Fall River, and Toronto) are used to capacity during the peak recreational season. The long range plans for these areas include additional recreational facilities to accommodate expected increases in visitor days. The El Dorado Reservoir, presently under construction by the Corps of Engineers, will inundate the present Lakes Bluestem and El Dorado. Recreational areas and facilities will be constructed for anticipated visitor use. Butler and Cowley State Fishing Lakes are used to design capacity. Recreational facilities to accommodate 200,000 visitor days annually are near completion at Winfield City Lake.

Recreational activities available at most of these locations include camping, fishing, picnicking, boating, swimming, hiking, hunting, and sightseeing. There are no known pollution sources which would affect the water quality of lakes and reservoirs enough to make them unsuitable for recreational purposes. Numerous private recreational areas, both income and non-income producing, are located within or close to the watershed. Private recreational areas are especially prevalent in this area because Wichita, the largest city in the state, borders the watershed.

The potential for such areas increases as income and population increase. Based on population projections, the need for recreational facilities will increase in the next 50 years.

#### Archeological, Historical, and Unique Scenic Resources

No historical sites listed in the National Register of Historic Places<sup>18/</sup> or with the Kansas State Historical Society<sup>19/</sup> are within the watershed.

The watershed area has potential for archeological sites. A highway corridor study for US-77 disclosed several site locations. The cultural time range estimated to be represented by the watershed area is from Paleo-Indian period to those of historic Indian tribes of the middle 19th century.<sup>19/</sup>

An inventory of archeological resources at proposed reservoir locations was made in coordination with the State Historic Preservation Officer in May 1975.<sup>28/</sup> The inventory included surface collection only. No evidence of prehistoric human occupation was found at Structure Nos. 1, 2, 3, 5, 6, 7, 8, 9, 10, 11, and 13. Single artifacts were found at each of Structure Nos. 12 and 14, although nothing else was found with which these artifacts could be associated. Three sites of prehistoric human activity were recorded at Structure No. 4. A follow-up assessment was recommended. This assessment is underway (see page II-44).

#### Soil, Water, and Plant Management Status

Land use within the watershed has been stable, with only a small conversion of cropland to grassland. A small acreage has been changed to lots for rural residences.

Substantial areas in the watershed are covered by native grass in good to excellent condition. Small pastures on the east side are planted to bermuda, fescue, and brome grass. Good pasture and hayland management will provide adequate soil protection to land in these uses. Planned grazing systems are needed on all livestock operations for efficient use of resources and maximum soil protection. Some farms in the watershed are not practicing proper land use and treatment. These landowners and operators are being encouraged by conservation district supervisors and watershed directors to practice proper land use and apply needed conservation land treatment.

There are 750 conservation district cooperators controlling 72 percent of the watershed area. Five hundred twenty-five basic plans have been made and additional plans are being developed. Cooperators within the watershed have applied many recommended conservation practices. The land treatment needs were identified and quantified for all watershed lands. The following table shows total acres needing treatment, amount applied, percent applied and untreated:

| <u>Land Treatment Status</u>  |             |                          |                      |                        |              |                  |
|-------------------------------|-------------|--------------------------|----------------------|------------------------|--------------|------------------|
| <u>Practice</u>               | <u>Unit</u> | Total                    | Acres                | <u>Percent Treated</u> | <u>Acres</u> | <u>Untreated</u> |
|                               |             | <u>Needing Treatment</u> | <u>Units Treated</u> |                        |              |                  |
| Conservation Cropping Systems | Ac.         | 87,515                   | 53,384               | 61                     | 34,131       |                  |
| Range Proper Use              | Ac.         | 62,165                   | 52,219               | 84                     | 9,946        |                  |
| Range Seeding                 | Ac.         | 4,333                    | 3,112                | 72                     | 1,221        |                  |
| Pasture Planting              | Ac.         | 10,238                   | 6,552                | 64                     | 3,686        |                  |
| Grassed Waterway              | Ac.         | 3,570                    | 1,531                | 43                     | 2,039        |                  |
| Diversion                     | Mi.         | 155                      | 47                   | 30                     | 108          |                  |
| Farm Pond                     | No.         | 738                      | 442                  | 60                     | 296          |                  |
| Grade Stabilization           |             |                          |                      |                        |              |                  |
| Structure                     | No.         | 321                      | 168                  | 52                     | 153          |                  |
| Terrace, Gradient             | Mi.         | 1,973                    | 460                  | 23                     | 1,513        |                  |

The 5,265 acres of woodland serve a beneficial function in watershed protection. Existing stands should be retained and managed for maximum efficiency. Improved protection and supplemental treatment are needed to restore and extend desirable hydrologic capability.

The watershed is protected by rural fire districts. Equipment procurement, firefighting training, and fire prevention education will be continued by the Kansas State and Extension Forester. The State and Extension Forester will cooperate with the Forest Service, through the Cooperative Fire Control Program, to achieve these goals. Adequate watershed fire protection can be achieved through this program without accelerated technical assistance.

The Butler County Commission has adopted a county-wide, comprehensive land use plan and initiated flood plain land use regulations. Sedgwick and Cowley Counties are moving to meet requirements of federal law.

The National Flood Insurance Act of 1968 (P.L. 90-448) and the Flood Disaster Protection Act of 1973 (P.L. 93-234) will serve to prevent further development in designated flood prone areas.

Winfield is currently participating in the federal flood insurance program. Augusta has received flood hazard boundary maps, but has not adopted ordinances regulating use of these areas. Unincorporated flood prone areas in the watershed include

the Wichita growth area in Butler and Sedgwick Counties and Springdale in Sedgwick County. Butler and Sedgwick Counties must apply for flood insurance and adopt programs of flood plain management to meet requirements of federal law. Both counties are taking definite steps toward compliance.

#### Projects of Other Agencies

The U.S. Army Corps of Engineers has three multipurpose reservoirs authorized in the Walnut River Basin. Towanda Reservoir on the Whitewater River above Augusta and El Dorado Reservoir on the Walnut River near El Dorado will provide additional flood protection to the mainstem Walnut River downstream from Augusta. Douglass Reservoir, east of Douglass on the Little Walnut River will provide additional flood protection for the Walnut River valley. P.L. 566 projects that are authorized for construction or completed, control the following Walnut River tributaries: Whitewater River, Upper Walnut River, Little Walnut River, Hickory Creek, Muddy Creek, Rock Creek, and Timber Creek.

The Corps of Engineers also has a local flood protection project authorized at Winfield. The proposed watershed project would protect Winfield from floods on both Timber Creek and the Walnut River.

See the Project Location Map for more detailed location of these projects.

#### WATER AND RELATED LAND RESOURCE PROBLEMS

##### Land and Water Management

Soil erosion is a problem on cultivated sloping upland. Soil loss from cropland is depleting the productivity of the soil, decreasing the life of farm ponds, depositing sediment on the flood plain and in stream channels, and creating a road maintenance problem.

Twenty percent of the land in the watershed is farmed by tenants. Most tenants operate on a year to year basis which makes application of conservation practices difficult. In 1969, 26 percent of the farms in Cowley County and 30 percent of the farms in Butler County had gross sales less than \$2,500. These facts indicate a lack of adequate funds for application of conservation practices.

Approximately 35 percent of the woodland acreage is being moderately to heavily grazed. Grazing at this intensity compacts the soil, destroys humus and litter, and seriously impairs the capacity of woodlands to retard erosion and runoff. Intense grazing also impairs reproduction of desirable trees, and thereby reduces economic potential.

Improper harvesting practices and failure to control undesirable trees after harvest have reduced timber production to less than one-tenth of its potential.

Some farms need protection from wind. Many farm ponds and odd areas need wildlife plantings to preserve and utilize natural resources. Some established windbreaks and shelterbelts need renovation to improve their effectiveness.

Wild fires, which occur periodically due to negligence or natural causes, may destroy grass and tree cover needed for wildlife and watershed protection. Fires also lower quality and growth rate of commercial timber stands. Increased efforts in detecting and reporting fires and general fire prevention education are needed.

The watershed area is developing rapidly with a movement of persons into the area looking for country home sites. Accelerated technical assistance is needed to provide planning and application assistance to individuals making land use changes and conservation treatment decisions.

#### Floodwater Damage

Damage from flooding of lands and facilities, including homes and buildings in moderately populated tributary flood plain areas, is the principal problem. Major damage is to growing crops that floods wash away, knock down, and/or cover with sediment. Flood durations are usually less than 24 hours. The majority of flooding occurs during the growing season but floods have occurred in every month of the year. Floods that occur before planting cause extra tillage operations. Flooding most frequently occurs during June.

Floods have recently occurred in 1943, 1944, 1945, 1951, 1961, 1964, 1965, 1967, 1968, 1969, 1970, and 1973. Average occurrence of overbank flow on the major tributaries ranges from twice a year on areas most frequently flooded to three times every four years on less frequently flooded areas.

Floodwater damage occurs in three areas: the upland near Wichita, major Walnut River tributaries, and mainstem Walnut River.

In upper, urbanized areas near Wichita, some land is valued at \$1,500 per acre. Near Wichita, land use is mostly urban with some rangeland. Homes located in Springdale will receive lawn and driveway damage from storms of 2- to 10-year frequency. Damage to buildings will begin with floods larger than the 10-year flood. Twelve properties near Springdale will experience flood damage. They range in value from \$53,000 to \$124,000 with the average being \$83,000 based on 1974 prices. Flood plain management practices in the form of zoning will limit future damages to existing properties. A flood hazard study is available and is fully supported by the county commissioners.

In major tributaries, including the lower part of Four Mile Creek, land values are \$600 per acre. Crop and pasture damage due to flooding on the tributaries averages \$104,000 annually and accounts for 74 percent of the total flood damage.

Mainstem Walnut River flood plain includes 19,402 acres on-project and 11,134 acres downstream from the watershed boundary. Land is valued at \$600 per acre. Land use is very similar to land use in the tributary areas.

Land use in evaluated reaches of the flood hazard area is:

| <u>Land Use</u> | <u>Acres</u> | <u>Percent</u> |
|-----------------|--------------|----------------|
| Cropland        | 7,417        | 86             |
| Rangeland       | 575          | 7              |
| Forestland      | 526          | 6              |
| Miscellaneous   | 118          | 1              |
| Total           | 8,636        | 100            |

Flood plain land use is not expected to change significantly during the evaluation period.

Flooding causes damage to buildings, fences, and machinery. Most flood flows damage or destroy fences. Installations such as cattle and hog pens, feed bunks, and stock tanks are frequently damaged. Considerable expense is incurred for cleanup of debris after flooding. Other agricultural damages of these types are estimated at \$19,200 annually.

Wildlife populations indigenous to flood plains have evolved, along with their characteristic habitats, in an environment subject to flooding. Seventy-five percent of the storms causing out-of-bank flows occur between April and August. Ground nesting species are susceptible to flooding during this period. Flooding may disrupt and/or destroy protective habitat, nests, and young birds. Terrestrial animals in the flood plain may be displaced or destroyed by floods resulting in short-term decreases in populations. Long term effects of flooding on wildlife may be beneficial by reason of its influence on natural flood plain plant succession. In addition, in view of current demands for agricultural production, periodic flooding serves to protect some remaining natural riparian habitats that could otherwise be removed by men.

Floodwater damage to 4.5 miles of roads and 37 bridges amounts to \$14,200 annually. Floods wash away road surfacing, scour road shoulders, fill road ditches with mud, and damage bridges. County and township budgets are not usually sufficient to make immediate replacements and repairs. Repair work is necessarily spread over a number of years, hence these essential facilities remain in poor condition.

On-project damage to the flood plain of the Walnut River occurs mostly as a reduction of agricultural production. Off-project damages in the Walnut River valley are nonagricultural to the City of Winfield and agricultural to crop production.

Small frequent floods, localized in character, cause considerable damage and inconvenience to farmers in the affected areas. A major flood, such as the one in June, 1965, affects everyone in the area due to damage to roads, bridges, utilities, and loss of business to those serving the agricultural community. Such indirect losses under future conditions without the project are estimated to average \$16,300 annually.

A major flood in June, 1965, resulted from flood flows with frequencies ranging from 3-year in reach 6 to more than 100-year in reach 22. This flood caused \$401,600 in damages, 70 percent of which were to crops and pastures.

#### Erosion Damage

All unprotected sloping cropland and some over grazed range-land has sheet and some rill erosion. Eroded areas are deficient in humus and droughty. The erosion rate from cropland averages 9.6 tons per acre per year. The range is from 3.0 to 24 tons per acre with 76 percent of the cropland exceeding 5 tons per acre. Soil losses from grassland range from 0.1 to 2.0 tons per acre. Average soil loss for the watershed is 5.1 tons per acre.

Flood plain scour is a problem. Potential production on 799 acres of good bottomland has been reduced by 10 to 28 percent. This costs \$21,600 annually.

Erosion has reduced the amount and quality of wildlife habitat. On small areas of severe erosion, all wildlife habitat has been destroyed. These small barren areas provide no food or cover for existing wildlife.

#### Sediment Damage

Only 17 percent of the upland soil loss enters the Walnut River. Most of the remaining 83 percent is redistributed within fields and trapped in upland ponds. A small percentage of the remaining volume is deposited on the flood plain and in channels near tributary junctions with the Walnut River. In an average year, sediment deposits average 1 inch in depth over as much as 250 acres near these junctions. This deposition, coupled with man's effort, will ultimately develop a new soil. The volume and size of deposited particles (0.02 to 0.25 mm) will not change the agricultural production of the soil. These deposits form a crust and retain moisture. Delay of field plantings, harvesting, and other agricultural operations is the result. Extra work required to break-up and incorporate this sediment increases fuel consumption, labor, and wear and tear on machinery. This damage costs \$3,100 annually.

The average annual sediment yield to the Walnut River is 106 acre feet. Sixty-three acre feet of this sediment will be deposited in Kaw Lake which is being built east of Ponca City, Oklahoma, on the mainstem of the Arkansas River. Annual sediment storage cost for 63 acre feet of sediment storage in Kaw Lake amounts to \$12,400. A prolongation of sediment storage will prolong the beneficial use storage capacity of the lake.

#### Drainage Problems

Flooding clogs natural field drains with sediment and debris and creates surface drainage problems, particularly on the flood plain of the lower reaches.

#### Irrigational Problems

Groundwater supplies are not adequate for irrigation in this watershed. Surface water for irrigation could be developed, but the total volume would be small.

High price of surface water storage, difficulty in delivery and distribution, and dependability of natural rainfall are all factors deterring irrigational development. It does not appear economically feasible to include irrigation in the development of the watershed.

#### Municipal and Industrial Water Problems

During the planning process, the towns of Rose Hill and Udall expressed needs for additional water storage.

Rose Hill obtains its water from two shallow wells (80 feet deep). These wells are apparently obtaining water from the lower part of the Wellington Formation. A 1974 water quality analysis made by the Kansas State Board of Health and Environment recorded a total dissolved solids concentration of 1,459 mg/l and a sulfate concentration of 806 mg/l. The treatment is chlorination. The average present water use is 0.060 million gallons per day (mgd). The maximum dependable ground water yield is 0.108 mgd.

Udall obtains its water from two shallow wells (29 and 31 feet deep). These wells are apparently obtaining water from alluvium in the Arkansas River valley. A 1974 water quality analysis made by the Kansas State Board of Health and Environment recorded a total dissolved solids concentration of 315 mg/l and a nitrate concentration of 5.4 mg/l. Nitrate concentrations have been measured as high as 32 mg/l. The treatment is gas chlorination at each well. The average present water use is 0.044 mgd. The maximum dependable ground water yield is 0.216 mgd.

Both of these towns are experiencing population increases: Rose Hill's population was 273 in 1960, 387 in 1970, 456 in 1971, and 506 in 1974; Udall's population was 600 in 1955, 658 in 1966, and 733 in 1974.

The watershed and surrounding areas are developing very rapidly. There is a migration from the Wichita metropolitan area to the watershed and adjacent communities by people wanting country home sites. Increases in population plus predicted increases in industrial activity in the area point to a need for additional water supply.

### Recreational Problems

Outdoor recreational facilities are inadequate. Existing recreational facilities do not meet existing needs. Projected population increases will make this problem more acute. The following table shows current and projected outdoor recreational facility needs that can most easily be met by a project of this type:

#### Recreational Facility Needs<sup>20/</sup>

| <u>Activity</u>    | <u>Boating<br/>(Acres)</u> | <u>Camping<br/>(No. of<br/>Sites)</u> | <u>Picnicking<br/>(Tables)</u> | <u>Swimming<br/>Beaches<br/>(Linear<br/>feet)</u> | <u>Nature &amp;<br/>Hiking<br/>Trails<br/>(Miles)</u> |
|--------------------|----------------------------|---------------------------------------|--------------------------------|---|---|
| <b>1972 Supply</b> |                            |                                       |                                |   |   |
| Butler*            | 846                        | 6                                     | 91                             | 0   | 2   |
| Cowley*            | 692                        | 1                                     | 93                             | 0   | 0   |
| <b>1975 Need</b>   |                            |                                       |                                |   |   |
| Butler             | 3,084                      | 49                                    | 35                             | 500   | 1   |
| Cowley             | 2,824                      | 48                                    | 20                             | 447   | 10  |
| <b>2000 Need</b>   |                            |                                       |                                |   |   |
| Butler             | 3,308                      | 52                                    | 42                             | 528   | 1   |
| Cowley             | 2,869                      | 49                                    | 21                             | 453   | 10  |

\*Only supply and need for Butler and Cowley Counties are presented because the major portion of the watershed lies in these counties.

### Plant and Animal Problems

The mainstem Walnut River and privately owned farm ponds do not provide adequate fishing opportunities for local fishermen. Fishing is poor in the lower reaches of the major tributaries during years of below average rainfall. Stream flows are reduced in the Walnut River and eliminated in all but the lower reaches of the tributaries during periods of drought with a consequent decline or loss of fishing.

Sediment frequently destroys spawning areas. Fish eggs are destroyed by floods and sediment during the spawning season. Sediment damages terrestrial wildlife by temporarily disrupting habitat use.

All of the agricultural area of the watershed is privately owned. Wildlife habitat ranges from fair to excellent. To maintain present levels of wildlife in the agricultural areas will require careful management of present wildlife cover and food resources. Waterfowl habitat within the watershed is limited primarily to the Walnut River and farm ponds. Quality ranges from poor to good and most sites are only fair. To increase wildlife to handle increased hunting would require more habitat or improved habitat conditions. Increased acreage of habitat would compete economically with agricultural production. The improvement of existing habitat conditions would not be competitive with economic considerations.

#### Economic and Social Problems

County-wide farm size is: Butler, 511 acres; Cowley, 479 acres; and Sedgwick, 329 acres. The average size of farms within the watershed is 180 acres. Farms in the watershed are generally low income units with limited funds available for application of conservation practices. Many operators are part-time farmers who maintain an off-farm job. Therefore, these units are affected by the high rates of unemployment existing in the area. The unemployment rate in Sedgwick County in December, 1970, was 7.2 percent.<sup>4/</sup>

Three operating units within the watershed hire more than one and one-half man years of labor per year.

#### Other

Most water for farmstead use is obtained from wells. Farm ponds supply most of the water for livestock. Both of these supplies are short during prolonged drought periods.

#### RELATIONSHIP TO LAND USE PLANS, POLICIES, AND CONTROLS

Middle Walnut Watershed lies in the Kansas subregion of the Arkansas-White-Red Water Resource Region<sup>7/</sup> designated by the Water Resources Council. The Arkansas River Basin in

Kansas,<sup>21/</sup> a comprehensive study report, shows 81 feasible P.L. 566 projects, including Middle Walnut Watershed. The total area for these projects is 15,674 square miles, or 37 percent of the Kansas portion of the Arkansas River Basin. Applications for P.L. 566 assistance have been received for 51 of these projects, covering 10,820 square miles. Eleven projects have been completed; 14 are authorized for construction; and 11 (including this project) are authorized for planning.

Installation of the works of improvement on all 81 feasible watershed projects would benefit 668,000 acres of flood plain land. In the proposed reservoirs the combined storage capacities would be 224,900 acre feet for sediment, 1,080,500 acre feet for floodwater detention, and 65,300 acre feet for multiple use.

At present, land use in the Kansas portion of the Arkansas River Basin is 57 percent cropland, 35 percent rangeland, 2 percent woodland, and 6 percent other uses. Cumulative effects from the 81 feasible watershed projects would convert 32,600 acres to water storage, and thus increase the amount of land in "other" uses by 0.1 percent.

A soil survey to assess land capabilities has been published for Butler County. Similar surveys are being made for Cowley and Sedgwick Counties. These surveys rate soil compatibility for different uses of the same site; and also rate different sites for compatibility with the same use. These ratings can be useful in general land use planning, in assessing hazards and development problems, in comparing different areas for a specific use, and in planning more detailed investigations at selected sites. Ratings are usually based on the upper 5 feet of soil.

A comprehensive plan for Butler County is published. A watershed plan element<sup>24/</sup> in the comprehensive plan considers works of improvement included in the general plan of Middle Walnut Watershed Joint District No. 60. This assures compatibility between the watershed plan and the comprehensive plan. It is also a first step to avoid conflicts between future development and the reservoir sites. The Butler County Commission is ready to adopt flood plain regulations. Sedgwick and Cowley Counties are considering flood plain regulation.

There are no other federal, state, or local land use plans proposed that relate to the Middle Walnut Watershed.

### ENVIRONMENTAL IMPACT

#### Conservation Land Treatment

A continued land treatment program will result in more efficient use of land and water resources and increased farm income. There has been no identification of areas that will be restored to former productivity.

Effects of land treatment will be: a 21 percent reduction in average annual flood damages, reduced erosion, improved soil tilth, improved water quality, increased moisture intake by the soil, and increased crop and livestock production. Soil erosion will be reduced from 5.1 to 4.0 tons per acre, a reduction of 22 percent.

Land treatment measures will generally increase habitat diversity and improve woodlands, thus leading to increased populations of game birds such as quail and pheasant. Crop residue management leaves more cover for wildlife during critical winter periods. Land treatment measures, especially on rangeland, will tend to improve prairie chicken habitat. Planned grazing systems provide for improved quality and quantity of herbaceous vegetation and will tend to improve habitat for ground dwelling birds and mammals. Some increase in the prairie chicken population could occur.

Some reduction in terrestrial wildlife habitat will occur as a result of land treatment measure installation. The installation of some waterways and detention dams will remove terrestrial habitat and reduce winter cover.

The level of flood protection and damage reduction on Four Mile Creek (reaches 17 through 29) is limited to that accomplished through the installation of land treatment measures and flood plain regulations.

Currently Middle Walnut Watershed, with 30 percent of the conservation treatment applied, is discharging 106 acre feet of sediment into the Walnut River yearly. In addition, sediment is being deposited in farm ponds and stream channels, and on flood plains. The planned conservation treatment, when installed, will reduce the sediment yield to the Walnut River 24 percent. More productive upland soil, less sediment deposition on the flood plain and in channels, and reduced sediment inflow to the Walnut River will result.

The forest land treatment program will make woodlands more beneficial to wildlife and more effective for reducing erosion. Woodlands with vigorous, fully stocked stands of trees and undisturbed ground cover will improve hydrologic conditions. Proper woodland management and proper land use of forest sites will maximize economic returns within site capabilities. Windbreak and shelterbelt plantings will break up wind and assist in reducing erosion.

Land use conversions will include 7,289 acres of cropland to: hayland (2,140 acres), pastureland (3,728 acres), rangeland (1,221 acres), and wildlife and recreational land (200 acres). In addition, 200 acres of rangeland will be converted to wildlife and recreational land.

#### Nonstructural Measures

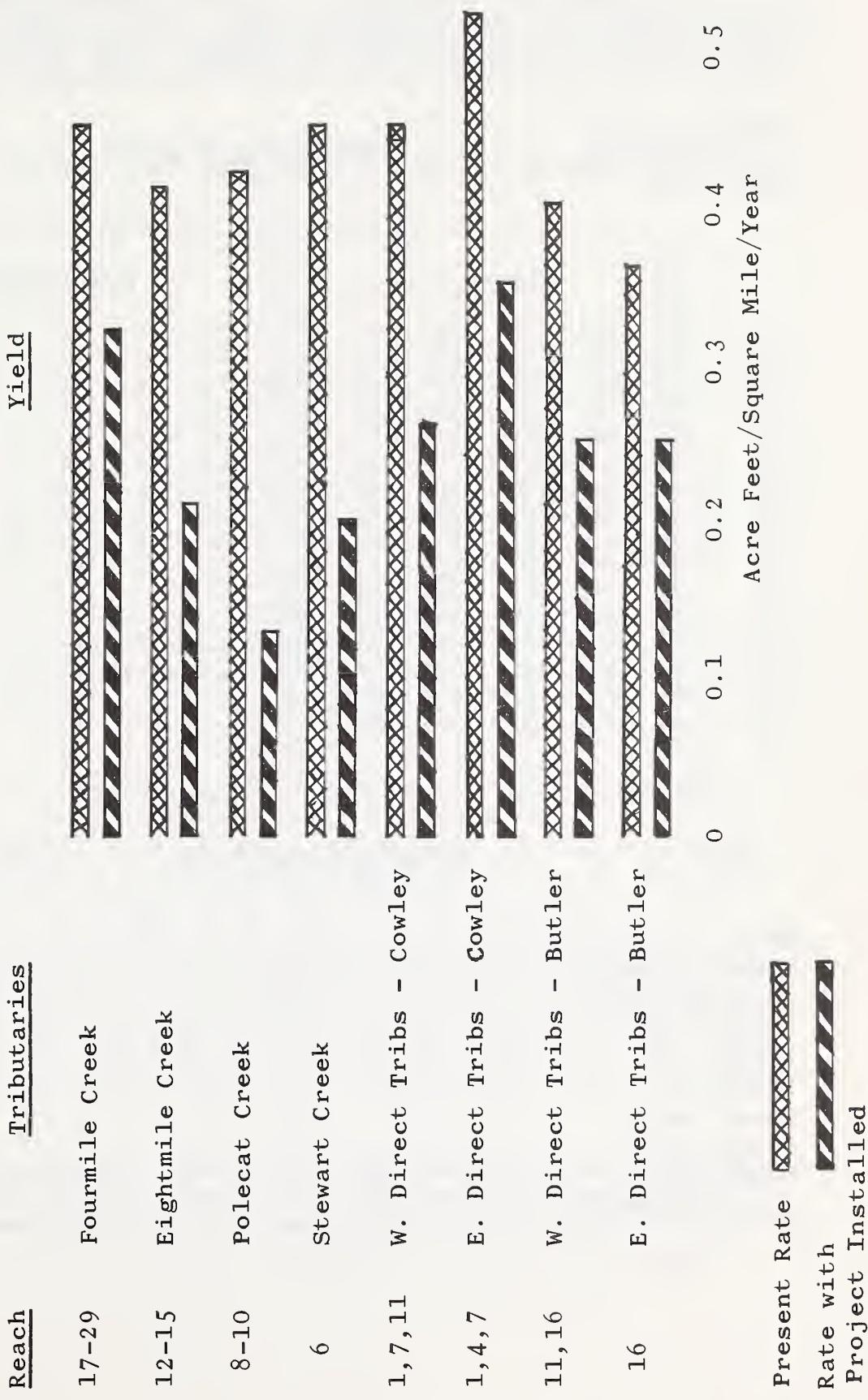
Nonstructural measures of flood damage reduction, such as flood insurance and flood plain regulation, will affect the entire watershed when imposed. Less development in flood prone areas will occur. Flood damages will be reduced, and compensation will be made (under the insurance program) for remaining damages.

#### Structural Measures

Installation of all project measures will reduce depth of flooding, sediment load transported, velocity of flood flows, and extent of flooding. The annual sediment yield to the Walnut River with all land treatment and structural measures in place will be 59 acre feet, a reduction of 44 percent (see the following figure).

Sediment Yields to Walnut River  
from  
Middle Walnut Tributaries

II-37



After project installation, flood frequency and severity will be reduced. The following table shows channel capacity for evaluated reaches. Peak discharges, with and without the project, are also shown for selected flood frequencies.

| Evalu-<br>ation<br><u>Reach</u>         | Bank<br><u>Full</u> | 100                    | 50  | 10  | 2   | 1    | Frequency (years) | 100                 | 50  | 10  | 2  | 1  |  |
|---|---------------------|------------------------|-----|-----|-----|------|-------------------|---------------------|-----|-----|----|----|--|
| ----- Peak Discharge (cfs/sq.mi.) ----- |                     |                        |     |     |     |      |                   |                     |     |     |    |    |  |
|   |                     | <u>Without Project</u> |     |     |     |      |                   | <u>With Project</u> |     |     |    |    |  |
| 1                                       | 34                  | 430                    | 379 | 226 | 97  | 58   |                   | 195                 | 135 | 66  | -- | -- |  |
| 2                                       | 83                  | 600                    | 516 | 305 | 118 | --   |                   | 153                 | 138 | --  | -- | -- |  |
| 6                                       | 58                  | 590                    | 500 | 289 | 111 | 61   |                   | 286                 | 238 | 135 | -- | -- |  |
| 8                                       | 34                  | 303                    | 253 | 150 | 62  | 33   |                   | 114                 | 96  | 56  | 26 | -- |  |
| 9                                       | 16                  | 420                    | 354 | 211 | 87  | 46   |                   | 76                  | 66  | 39  | 20 | -- |  |
| 11                                      | 26                  | 200                    | 166 | 98  | 44  | --   |                   | 122                 | 106 | 67  | 30 | -- |  |
| 12                                      | 25                  | 258                    | 212 | 122 | 46  | 29   |                   | 144                 | 123 | 76  | 33 | -- |  |
| 13                                      | 47                  | 330                    | 270 | 152 | 63  | --   |                   | 178                 | 150 | 91  | -- | -- |  |
| 14                                      | 50                  | 430                    | 360 | 210 | 86  | --   |                   | 260                 | 220 | 131 | 54 | -- |  |
| 15                                      | 28                  | 600                    | 510 | 300 | 121 | 66   |                   | 172                 | 148 | 93  | 45 | -- |  |
| 17                                      | 22                  | 270                    | 222 | 129 | 54  | 29]  |                   |                     |     |     |    |    |  |
| 18                                      | 20                  | 308                    | 253 | 148 | 60  | 33]  |                   |                     |     |     |    |    |  |
| 19                                      | 30                  | 360                    | 300 | 175 | 70  | 38]  |                   |                     |     |     |    |    |  |
| 22                                      | 35                  | 520                    | 440 | 261 | 109 | 58]  |                   |                     |     |     |    |    |  |
| 27                                      | 125                 | 730                    | 620 | 395 | 167 | --]  |                   |                     |     |     |    |    |  |
| 28                                      | 33                  | 810                    | 700 | 425 | 179 | 102] |                   |                     |     |     |    |    |  |

Projected land use in the flood plain is:

| <u>Crop</u>    | <u>Without Project Use</u><br>(percent) | <u>With Project Use</u><br>(percent) |
|----------------|---|--------------------------------------|
| Wheat          | 26                                      | 23                                   |
| Grain Sorghum  | 15                                      | 17                                   |
| Sorghum Silage | 3                                       | 2                                    |
| Corn Silage    | 9                                       | 10                                   |
| Alfalfa        | 21                                      | 22                                   |
| Soybeans       | 13                                      | 14                                   |
| Tame Pasture   | 3                                       | 2                                    |
| Rangeland      | 3                                       | 3                                    |
| Woodland       | 6                                       | 6                                    |
| Miscellaneous  | 1                                       | 1                                    |
| Total          | 100                                     | 100                                  |

The planned project will accomplish a 59 percent reduction in average annual flood damage on tributary areas. The area affected in each reach and percentage reduction in damages is:

| <u>Evaluation<br/>Reach</u> | <u>Area Affected</u><br>*/<br>(acres) | <u>Percent Damage<br/>Reduction</u> |
|-----------------------------|---------------------------------------|-------------------------------------|
| 1                           | 881                                   | 45                                  |
| 2                           | 420                                   | 85                                  |
| 6                           | 239                                   | 85                                  |
| 8                           | 922                                   | 94                                  |
| 9                           | 412                                   | 84                                  |
| 11                          | 1,978                                 | 62                                  |
| 12                          | 552                                   | 42                                  |
| 13                          | 401                                   | 75                                  |
| 14                          | 348                                   | 50                                  |
| 15                          | 119                                   | 71                                  |
| 17                          | 608                                   | 25                                  |
| 18                          | 558                                   | 20                                  |
| 19                          | 494                                   | 14                                  |
| 22                          | 627                                   | 7                                   |
| 27                          | 61                                    | 1                                   |
| 28                          | 16                                    | -                                   |
| Total                       | 8,636                                 | 59                                  |

\*/ In addition, 19,402 acres of on-project Walnut River flood plain and 11,134 acres of off-project Walnut River flood plain will be affected by the project. Structural measures will reduce flooding on 6,272 acres of tributary flood plain, 7,094 acres of on-project Walnut River flood plain and 11,134 acres of off-project Walnut River flood plain.

Flooding will be reduced through installation of planned Corps of Engineers reservoirs and watershed development. When El Dorado and Towanda Reservoirs, and Whitewater River and

Upper Walnut River Watersheds are completed, 89 percent of the Walnut River drainage area above Augusta will be controlled by structural measures. This control plus Douglass Reservoir and Little Walnut-Hickory, Muddy Creek, Rock Creek, Timber Creek, and Middle Walnut Watersheds will control 69 percent of the drainage area above Winfield.

Reduction in depth and frequency of flooding will substantially affect crop production. Structural measures will reduce floodwater damage. Damage from a flood similar to the June, 1965, flood will be reduced 32 percent, from \$401,600 to \$274,400. The area flooded annually in tributary reaches will be reduced 46 percent, from 3,211 to 1,736 acres. A reduction in the flood hazard will induce farmers to use more fertilizer, improved crop varieties, and establish soil building rotations. Timely performance of agricultural operations will improve production and be easier to achieve.

Flood plain scour will be reduced so that losses in productivity will be reduced by 45 percent. Reduction in flooding will facilitate regaining of normal production on previously damaged land.

A substantial reduction in cost of maintaining roads and bridges on the flood plain will be realized. Passage of goods through the watershed will be more efficiently maintained. The 65 percent reduction in cost of repairing floodwater damage to roads and bridges will release funds for other uses.

Experience has shown that incidental recreation will occur as a use of water in sediment pools. The concentration of people at any one reservoir, except the multipurpose reservoir, is expected to be small. Extensive recreational use will be prohibited where adequate sanitary facilities are not provided.

Sediment pools will provide a source of water for livestock. All of the floodwater retarding structures are located in, or adjacent to, rangeland.

Present uses of the lands to be used for structural measures are as follows:

| <u>Structural Measure</u>          | <u>Present Land Use (acres)</u> |                  |                 | <u>Total</u> |
|------------------------------------|---------------------------------|------------------|-----------------|--------------|
|                                    | <u>Cropland</u>                 | <u>Rangeland</u> | <u>Woodland</u> |              |
| Sediment and Other Permanent Pools | 194                             | 232              | 92              | 518          |
| Detention Pools                    | 435                             | 728              | 62              | 1,225        |
| Dams and Spillways                 | 82                              | 78               | 7               | 167          |
| <b>Total</b>                       | <b>711</b>                      | <b>1,038</b>     | <b>161</b>      | <b>1,910</b> |

Good wildlife habitat for most species occurs throughout the watershed. With the application of compensating measures and enhancement plans for each reservoir site, and other wildlife considerations throughout the watershed, anticipated effect on wildlife populations and hunting opportunities is slight. Waterfowl hunting opportunities should increase. Populations of fish and water-oriented wildlife are expected to increase due to the impoundments.

Because of terrestrial invertebrate species diversity and population levels, land inundated by reservoirs will result in neither significant changes in species diversity nor important reduction in the number of individuals in the area.

Impoundments should have little effect on terrestrial invertebrates in the watershed district. In sediment pool areas, invertebrate species associated with trees will be reduced. As new trees become established around the pools, these invertebrates will increase.

A decrease of fly and mosquito populations in the watershed is expected due to control of flood waters and the decrease of flooded depressions along streams.

Flood related mortality to ground dwelling species inhabitating the flood plain will be reduced.

Increased application of fertilizers and pesticides induced by reduced flood hazard will increase introduction of same to aquatic and terrestrial ecosystems. Levels of fertilizer and chemical pesticides are not expected to be high enough to result in adverse effects on fish or wildlife populations.

Some seepage will occur, primarily through the abutments, at Structure Nos. 1 through 6 containing limestone members in the abutments and underlain by rocks of the Chase Group. Negligible seepage is expected to occur at Structure Nos. 7 through 15 to be constructed primarily in shale and underlain by rocks of the Sumner Group. Structures will have no significant effect on ground water levels or quality.

Sediment pools of the 14 proposed floodwater retarding structures will provide 425 acres of potential fishing water. These pools will average 30 surface acres and range from 8 to 73 acres. Average depth will be sufficient to support a warm water fishery. Depths will decrease as sediment pools are filled. Aquatic habitat in the Walnut River and its tributaries will improve as a result of decreased sediment. The increased duration of flows within channels will have a negligible effect on channel gradient and bank stability.

Recreational facilities at multipurpose Structure No. 4 are designed for 50,000 annual recreation visits. The period May 15 through September 15 is the primary season of use. Approximately 42,500 visitor days will occur during this season. 7,500 visitor days will occur during the remainder of the year. The planned facilities are designed to accommodate 1,000 recreation visits on a maximum use (weekend) day. Anticipated activities of users are: 30 percent swimmers, 22 percent sightseers, 20 percent fishermen, 15 percent picnickers, 10 percent campers, 3 percent other uses. The value of a recreation visit is set at \$2.25 for figuring the benefits of the recreational development.

Multipurpose Structure No. 4 is expected to provide 10,000 man days of fishing annually. This will be accomplished by providing facilities for fishermen, stocking suitable game fish, and properly managing the fishery.

Water quality in the multipurpose reservoir is expected to be adequate for the intended use and to meet state water quality criteria.11/

Transporting, processing, and marketing of agricultural commodities will be more dependable. Crop losses will be reduced. Increased farm income will increase the net return to local retailers. More goods and services will be required on the farm to achieve maximum benefits from increased production potential.

Installation of the project will provide 66 man years of new employment during the 7-year installation period. Operation and maintenance of the structures and the recreational facilities will provide three man years of employment annually.

Aesthetic values will decrease for residents adjacent to the public recreational area. Traffic, litter, and noise will increase. Modification of Highway K-15 adjacent to the development area may be required to adequately take care of additional recreational vehicle traffic.

The recreational development will provide open space for public use as well as providing recreation and fish and wildlife uses.

Some soil erosion and air and water pollution will occur during reservoir construction.

Agricultural uses will be lost on lands to be permanently inundated, occupied by dams and spillways, and occupied by recreational facilities. This use will be reduced on lands occasionally flooded in the retarding pools. Losses in agricultural production are reflected in the estimated land rights costs used in project evaluation.

Relocations are not expected to significantly affect the social, economic, or environmental elements of the watershed. There are five small farm operations eligible for relocation assistance. No dwellings are affected. None of the 15 affected people is expected to choose to move. Operators are either working only part-time on the farm or are semi-retired. Individuals eligible for relocation may experience considerable indecision, anxiety, or disappointment over their available options.

Many flood plain residents will have improved living conditions and economic and psychological security from reduced flooding (see Appendix A for evaluated benefits). Flood damage reduction will affect an estimated 37,500 people within the watershed. All or parts of 350 farms are located in the flood plain and are directly affected by watershed works of improvement. Proposed project action will have no significant economic or social effect on minority groups.

A false sense of security and future flood plain development may result from increased levels of flood protection unless flood plain management is used. More intensive use of these lands, particularly in identified flood hazard areas would increase potential damages from floods.

Mineral resources within the watershed will not be affected by the project.

The Kansas State Historical Society notes that no known historic buildings or sites will be affected by proposed structural measures.<sup>19/</sup>

A May 1975 archeological inventory coordinated with the State Historic Preservation Officer found and recorded three sites of prehistoric human activity at Structure No. 4.<sup>28/</sup> One of these sites will not be disturbed by construction activities or impoundment. The remaining two sites could be affected by construction or inundation. A follow-up assessment for the two latter sites is underway to determine the significance of these sites, impacts of construction or impoundment, and recommended actions. The follow-up assessment report will be completed when the land is acquired for the reservoir. The investigating archeologist has submitted an interim statement regarding these sites.<sup>29/</sup> The interim statement states that one of the sites does not initially appear to be eligible for nomination to the National Register of Historic Places. A determination of the significance of the other site as well as recommendations regarding the eligibility of the site for nomination to the National Register of Historic Places will be presented in a forthcoming report on the test investigations.

Archeological sites that may be discovered during construction of the proposed reservoirs will be reported promptly to the State Archeologist and National Park Service. If these properties are determined to possess criteria for inclusion in the National Register of Historic Places, then comments from the Advisory Council on Historic Preservation will be requested in accordance with the procedures for protection of historic and cultural resources.

#### FAVORABLE ENVIRONMENTAL EFFECTS

Adequate management and protection on an additional 33,622 acres of cropland, 10,196 acres of rangeland, and 850 acres of woodland will be provided. Also 52,591 acres of fire control will be provided.

Average soil loss will be reduced from 5.1 to 4.0 tons per acre per year. This is a 22 percent reduction. Land treatment will improve water quality in tributaries and the Walnut River by reducing the movement of soil particles which often transport pollutants and by reducing sediment.

There will be less sediment deposition in road ditches and farm ponds. Average annual sediment yield to the Walnut River will be reduced from 106 to 59 acre feet, a 44 percent reduction.

Reservoirs will increase landscape diversity, provide impoundment fish habitat, and provide additional feeding and resting sites for waterfowl.

Average annual flood damages will be reduced by 59 percent on 8,636 acres of flood plain land. Flood protection in Winfield will be increased. All or parts of 350 farms will have reduced flood damages. Average annual crop and pasture damages will be reduced 65 percent. Average annual flood plain scour will be reduced 45 percent.

Flood damage to roads and bridges will be reduced 66 percent. Multipurpose Structure No. 4 will provide 93 acres for public warm-water fishing and water-based recreation. There will be 425 acres of warm-water fishing created on private lands. A total of 332 acres for public recreation and open space will be provided at Structure No. 4. There will be 50,000 annual visitor days of recreation provided, including 10,000 annual fishing days.

Wildlife habitat will be improved by planting grasses, legumes, trees, and shrubs; providing unharvested grain; allowing native grass pastures to become fully re-established; and constructing brush piles.

Sediment pools will provide some livestock water and flow stabilization for the creeks on which they are located.

Values of flood plain land may rise with increased flood protection, thereby raising tax revenues of local and county governments and profits to landowners upon the sale of these lands.

Installation of structural measures will provide 66 man years of new employment. Operation and maintenance will provide 3 man years of employment annually.

Rural area development will be advanced through increased farm incomes, higher land values, decreased flood expenses, and a more stable economy.

Some disease vectors and other pestiferous invertebrates will decrease in undisturbed riparian habitat.

Farmstead windbreaks will not only break up winds, but also beautify farms.

During drought periods low flow in stream reaches below reservoirs will be increased when releases are made.

#### ADVERSE ENVIRONMENTAL EFFECTS

Agricultural use and terrestrial wildlife habitat will be permanently lost on 518 acres that will be flooded by sediment and beneficial use pools.

Periodic flooding of 1,225 acres by detained floodwater will interrupt and reduce agricultural and wildlife uses.

Agricultural uses and 7 acres of woodland will be lost on 167 acres to be occupied by dams and spillways. Wildlife uses of these areas will be temporarily interrupted until vegetation is re-established.

Loss of agricultural use will occur on 40 additional acres that will be managed primarily for public recreation and wildlife habitat. Reservoirs will inundate 10.1 miles of intermittent stream.

During installation of structural measures, 99 acres of woodlands will be removed; a total of 62 acres of woodlands will be affected by periodic flooding. Clearing of brush and woodlands will decrease habitat for some species.

Aesthetic values will decrease for residents adjacent to the public recreational area. Traffic, litter, and noise will increase. Modification of highway K-15 adjacent to the development area may be required to adequately take care of additional recreational vehicle traffic.

Some roads immediately above structures will be closed causing inconvenience to local residents.

An estimated 15 persons will have to relocate or accept a reduced size of their farm operation.

#### ALTERNATIVES

Nine alternatives considered in the formulation of the project are displayed in the table on the next page. These alternatives were analyzed for physical feasibility, sources of authority, availability of local sponsors, effect on adverse environmental impacts, viability, and cost. A viable alternative is defined as one which is physically feasible and could be carried out under an existing authority. Cost estimates are included for viable alternatives that reduce or eliminate adverse impacts of the proposed project. Thus, only those alternatives which received cost estimates were considered further. A brief description of viable alternatives for which cost estimates were made follows:

Alternative number 1 is the same as the proposed project except that sediment pools of the 14 floodwater retarding structures would be dry. Dry pools would replace 9.4 miles of intermittent stream and associated flood plain with 425 acres of frequently flooded odd area habitat. The aesthetics and incidental benefits associated with the development of 425 acres of aquatic habitat would be foregone. The cost of this alternative would be \$7,562,000.

Alternative number 2 is to allow present trends to continue. The existing land treatment program would continue. Net project benefits of \$90,500 would be foregone annually. The cost of continuing the existing land treatment program for 7 years would be \$2,508,500.

Alternative number 3 consists of supplementing the existing land treatment program with an accelerated program. Resource management systems would be installed in 7 years on 44,668 acres of agricultural land. The average soil loss

MIDDLE WALNUT WATERSHED

Matrix Analysis of Alternatives (X = yes, O = no)

| Alt.<br>No. | Description                          | Alternative Components |             |     |    |   |          | Phys.<br>Feasi-<br>bility | Authority<br>PL566<br>Other | Local<br>Sponsor-<br>ship | Effect on<br>Adverse<br>Impacts | Viable    | Cost              |           |
|-------------|--------------------------------------|------------------------|-------------|-----|----|---|----------|---------------------------|-----------------------------|---------------------------|---------------------------------|-----------|-------------------|-----------|
|             |                                      | Acc.<br>L.T.           | M.P.<br>Rec | M&I | CW | Z | P<br>No. |                           |                             |                           |                                 |           |                   |           |
| 1           | As planned:<br>FRS's dry             | X                      | X           |     |    |   | 14       | X                         | X                           | O                         | Reduce                          | X         | \$ 7,562,000      |           |
| 2           | No project                           |                        |             |     |    |   |          |                           |                             | Elimn.                    | X                               | 2,508,500 |                   |           |
| 3           | Acc. L.T.<br>only                    | X                      |             |     |    |   |          | X                         | X                           | X                         | Reduce                          | X         | 4,139,500         |           |
| 4           | Flood plain<br>purchase              |                        |             |     | X  |   |          | X                         | O                           | O                         | Elimn.                          | X         | 11,669,500        |           |
| 5           | As planned:<br>no M.P. dev.          | X                      |             |     |    |   |          | 15                        | X                           | X                         | X                               | Reduce    | X                 | 7,168,200 |
| 6           | Acc. L.T.<br>and C.W.                | X                      |             |     |    |   |          | X                         | X                           | X                         | Incrs.                          | O         | --                |           |
| 7           | Instl. of<br>M.P. Str.<br>No. 4 only |                        |             |     | X  |   |          | X                         | X                           | X                         | Reduce                          | X         | 3,221,700         |           |
| 8           | Instl. of<br>M.P. Str.<br>No. 12     |                        |             |     | X  |   |          | X                         | X                           | O                         | Reduce                          | X         | 3,071,800         |           |
| 9           | Acc. L.T.<br>+ F.P.<br>zoning        | X                      |             |     |    |   |          | X                         | X                           | X                         | Reduce                          | X         | <u>4,139,500+</u> |           |

Acc. L.T. - Accelerated Land Treatment

M.P. - Multipurpose

Rec - Recreational Water Supply

M&I - Municipal and Industrial Water Supply

CW - Channel Work

Z - Flood Plain Zoning

P - Purchase

FPS - Floodwater Retarding Structure

Elmn.

- Eliminate

Incrs. - Increase

All alternatives include on-going land treatment.

from upland soils would be reduced from 5.1 to 4.0 tons per acre. Average annual sediment deposition in existing ponds would be reduced 22 percent and the average annual sediment yield to the Walnut River would be reduced from 106 to 81 acre feet. The cost of this alternative would be \$4,139,500.

Alternative number 4 consists of purchasing the tributary flood plain lands within the project area. The existing land treatment program would continue. Wildlife habitat would be improved by re-establishing native vegetation and installing wildlife management on 8,000 acres of purchased flood plain land. Eight thousand acres would be available for public recreation and open space. Public access along 55 miles of stream within the tributary flood plain would provide opportunity for 50,000 annual recreational visits. A 60 percent reduction in average annual flood damages would be achieved; increased damages on tributary flood plain lands would be prevented. Twenty farm operations including 25 dwellings and 62 persons would be relocated as a result of land acquisition. Agricultural production from 8,000 acres of flood plain land would be foregone annually. The cost of this alternative would be \$11,669,500.

Alternative number 5 is the same as the planned project except that a single purpose floodwater retarding structure would be installed in place of the multipurpose structure. This alternative would reduce the planned project water impoundment area by 33 acres and reduce the area periodically flooded by retention of runoff by 6 acres. Inundation of 0.7 fewer miles of intermittent stream would occur. The relocation of five farm operations associated with multipurpose Structure No. 4 would be avoided. The cost of this alternative would be \$7,168,200.

Alternative number 7 consists of multipurpose Structure No. 4 only. The existing land treatment program would continue. The multipurpose pool would inundate 1.4 miles of intermittent stream and 93 acres of wildlife habitat. An additional 192 acres would be flooded periodically as a result of floodwater detention. The cost of this alternative would be \$3,221,700.

Alternative number 8 consists of a multipurpose flood-water retarding-municipal and industrial water supply structure at the location of planned Structure No. 12. The existing land treatment program would continue. The multipurpose pool would inundate 1.8 miles of intermittent stream and 169 acres of wildlife habitat. An additional 133 acres would be flooded periodically as a result of floodwater detention. The cost of this alternative would be \$3,071,800.

Alternative number 9 consists of accelerated land treatment and flood plain zoning to restrict future development on flood plain lands. Unwise development and future increases in damage to residential property would be prevented through restrictive zoning. The cost of this alternative would be \$4,139,500 for the land treatment plus an undetermined amount for flood plain management implementation.

#### SHORT-TERM vs LONG-TERM USE OF RESOURCES

Land use has stayed essentially constant within the watershed. Cropland and grassland constitute over 90 percent of the land. This pattern is expected to continue, with the exception of urban expansion in the immediate vicinity of area cities, especially Wichita. The number of farms is remaining constant as described in the Economic Resources subsection of the Watershed Resources - Environmental Setting section.

The project will reduce options for long-term land uses only on the areas incorporated into the dams, spillways, sediment pools, floodwater retarding areas, or the multiple use reservoir. Land used for these purposes can be returned to former uses whenever it becomes economically and socially acceptable to do so. The proposed project is compatible with long-term land use trends in this watershed and will help stabilize the economic system of the area.

The structural measures of the project are expected to continue to provide some flood prevention and sediment control after the end of their assigned life if hydrologic conditions are not substantially altered.

Projected population increases<sup>22/</sup> indicate a 100 percent increase by the year 2020. This project would help meet the basin's increased recreational needs.

#### IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Agricultural use and terrestrial wildlife habitat will be lost on 518 acres to be inundated by sediment and beneficial use pools. An additional 1,225 acres in the flood-water retarding areas of the reservoir structures will be periodically flooded. Reduction of agricultural use and terrestrial wildlife habitat use in these areas will occur. The 167 acres to be used for dams and spillways will be lost for terrestrial wildlife use until revegetation occurs. Reservoirs will inundate 10.1 miles of intermittent stream.

Present uses of the lands to be used for structural measures are as follows:

| <u>Structural Measure</u>    | <u>Present Land Use (acres)</u> |                  |                 |              |
|------------------------------|---------------------------------|------------------|-----------------|--------------|
|                              | <u>Cropland</u>                 | <u>Rangeland</u> | <u>Woodland</u> | <u>Total</u> |
| Sediment and Permanent Pools | 194                             | 232              | 92              | 518          |
| Detention Pools              | 435                             | 728              | 62              | 1,225        |
| Dams and Spillways           | 82                              | 78               | 7               | 167          |
| Total                        | 711                             | 1,038            | 161             | 1,910        |

Construction of the P.L. 566 structures will require 66 man years of new employment, and operation and maintenance of the structures and recreational facilities will require 3 man years of employment annually. Total project installation cost will be \$7,647,500.

Installation of the structural measures of this project will require about 200,000 gallons of diesel fuel.

CONSULTATION AND REVIEW WITH  
APPROPRIATE AGENCIES AND OTHERS

In 1958, residents of the Polecat Creek Watershed began holding informal meetings directed toward organization of a watershed district. Later this group expanded their area of concern to include Eight Mile and Four Mile Creeks. Landowners and operators from the lower valley north of Winfield joined the group. Formal incorporation came on September 18, 1963.

Application for planning priority under P.L. 566 was filed in May, 1965, with the Watershed Review Committee. A supplementary application was filed in May, 1967. The application was sponsored by Cowley, Butler, Sedgwick, and Sumner Counties Conservation Districts, the cities of Rose Hill and Udall, and the Middle Walnut Watershed District.

The Watershed Review Committee conducted a field examination of the watershed. A published notice announced the examination and invited public attendance. The examination consisted of a tour of the watershed followed by a meeting with the sponsors and other community leaders. The Watershed Review Committee Field Inspection Team, the Soil Conservation Service, the Forest Service, the Extension Service, the watershed district, and interested individuals were all represented in this study. The field examination showed that a flood prevention and watershed treatment program with development of water supply for municipal and industrial and recreational use was needed.

The application for assistance in planning and carrying out works of improvement under P.L. 566 was approved by the Watershed Review Committee. The application was then filed with the Soil Conservation Service. On July 26, 1967, the Watershed Review Committee recommended Middle Walnut Watershed for planning and assigned priority number 53.

Pursuant to the application for assistance, representatives of the Watershed Planning Staff from the Soil Conservation Service, Salina, Kansas, made a reconnaissance of the watershed. These representatives included planning specialists in hydrology, geology, engineering, and economics. A preliminary investigation report was subsequently prepared for the sponsors. Sponsors agreed to proceed with planning based on this information. News items in local newspapers informed the public of

preliminary project objectives and the probable scope of planned works of improvement.

A request to the Administrator of the Soil Conservation Service for authorization to provide planning assistance to Middle Walnut Watershed District was made on April 25, 1968. This authorization was granted on September 9, 1968, under the authority of the Watershed Protection and Flood Prevention Act (P.L. 566).

On June 16, 1969, the SCS Watershed Planning Staff met with sponsors to report the planning progress. This meeting was designed to prepare the Watershed District Board of Directors for their responsibilities in formulating a project. Presentations were given by each staff specialist to acquaint district board members with procedures used in developing planning data. Average annual flood damages and potential benefits of the flood protection program were presented with visual aids. Procedures for developing structure designs and cost estimates were explained. As in earlier meetings, information useful to district board members in selecting structure sites was discussed.

On June 17, 1969, the watershed district board formulated a program of flood control and land treatment measures. The board further decided to expand project measures to include water supply for municipal, industrial, and public recreational uses.

Since submitting its application for assistance under the P.L. 566 Watershed Act, the watershed district board has carried out a continuing informational exchange program with the general public. Some activities of this program are listed below:

1. Regular monthly meetings open to the public have been held. Specialists have usually been available to discuss specific planning problems.
2. Annual meetings, advertised in advance in the principal county newspapers, have been conducted.
3. There were several meetings between watershed board representatives and officials of townships, state and county highway departments, and the other sponsors.

4. Frequent person-to-person contacts have been made between watershed directors and individual farmers in order to explain the program and encourage the application of land treatment measures. Most of the farmers within the watershed have been contacted.
5. Tours to other watersheds have been sponsored by the district board.
6. Public informational meetings have been conducted, and a public hearing on the general plan was held.

The sponsoring conservation districts are in full support of the proposed watershed program. News media, business people, and others are giving substantial backing to the project. There has been considerable opportunity for residents and land-owners in the watershed to participate in formulating the project objectives.

During project formulation, the Bureau of Sport Fisheries and Wildlife, cooperating with the Kansas Forestry, Fish and Game Commission and the Soil Conservation Service, completed a detailed study of the proposed project area. Mitigation measures recommended in the Bureau of Sport Fisheries and wildlife report<sup>57</sup> were incorporated during project planning.

The Board of Directors, at the December, 1969, meeting considered and reaffirmed the watershed objectives and enumerated specific means by which the district could accomplish its objectives and discharge its responsibilities.

One of the means was flood plain management: "To request, through the Division of Water Resources, State Board of Agriculture, assistance in setting up flood plain management studies."<sup>23/</sup> These data were to be used in planning to reduce flood damage to existing homes in the flood plain, and to furnish local planning groups with information to adequately zone flood plain land.

To implement flood plain management, the watershed board, in August, 1972, asked the County Commission in Butler County to initiate, through the Butler County Planning Commission, a flood plain zoning program. Technical data was furnished by the Soil Conservation Service from a flood hazard analysis study. The flood hazard analysis report does not include the effects of the

planned watershed project. A revised report will be needed when the project is completed.

In December, 1972, the watershed district eliminated proposed channel work from their plan because of the adverse environmental effects involved.

The City of Rose Hill terminated their sponsorship of the proposed multipurpose Structure No. 12 for water supply because of increased costs and delays in developing the watershed plan.

A forestry work plan was developed by the State Extension Forester, Kansas State University, and the Forest Service.2/ The forestry work plan was considered in the project design.

The Kansas State Archeologist and the State Historic Preservation Officer were consulted to determine present historical and archeological resources in the watershed and the impact of the proposed project on these resources.19/

A public meeting was held on October 9, 1975, in Augusta to discuss the draft plan and environmental impact statement. About 90 persons attended the meeting.

Introductions were made and copies of the draft plan and environmental impact statement were distributed. It was explained that the plan was required for congressional authorization of the project, and the environmental impact statement was designed to inform the public of the project's environmental effects. The role of Middle Walnut Watershed in Walnut River Basin and in the overall state watershed program was briefly described. Responsibilities of the Soil Conservation Service; the Watershed District; the City of Udall; and Butler, Cowley, Sedgwick and Sumner County Conservation Districts in all phases of the program were pointed out.

Sections of the plan and environmental impact statement were reviewed, including the planned project, project benefits and costs, operation and maintenance, project financing, environmental setting, water and related land resource problems, environmental impacts, and alternatives.

A question and answer session concluded the meeting. A tape recording and transcript of the meeting were made and are available at the SCS office in El Dorado.

The following agencies, conservation groups, and organizations have been asked to comment on the draft environmental impact statement:

- \* Department of the Army
- \* Department of the Interior
- \* Department of Commerce
- \* Department of Health, Education, and Welfare
- \* Department of Transportation
  - Office of Equal Opportunity, USDA
- \* Environmental Protection Agency
  - Federal Power Commission
- \* Advisory Council on Historic Preservation
- \* Governor of Kansas
- \* Division of State Planning and Research, Department of Administration, State of Kansas (Clearinghouse)
  - Natural Resources Defense Council
  - Friends of the Earth
  - Environmental Defense Fund
  - National Wildlife Federation
  - National Audubon Society
  - Environmental Impact Assessment Project
- \* State Historic Preservation Officer
  
- \* Response received

Each environmental issue, problem, or objection raised during the formal inter-agency review of the draft watershed plan and environmental impact statement is summarized in the following discussion:

Kansas State Historical Society  
(Comments dated December 8, 1975)

Comment - We note that an inventory has been made of the archeological resources in the affected areas and that a further assessment was to be made at Structure No. 4. Those additional findings should be included in the final environmental impact statement.

Disposition - The additional information concerning archeological studies at Structure No. 4 have been included on page II-44.

U. S. Department of Commerce  
(Comment dated February 2, 1976)

Comment - Flash flood watch and warning services are available to residents within the watershed through the National Weather Service and should be noted in the report.

Disposition - This information has been included in the environmental setting section.

Kansas Forestry, Fish and Game Commission -  
Through the State Clearinghouse  
(Comment dated February 4, 1976)

Comment - It was suggested that habitat can be improved without economically competing with agricultural production.

Disposition - The environmental impact statement has been reworded to incorporate this suggestion.

Comment - An impoundment system will reduce sedimentation, and thus improve stream aquatic habitat conditions, but the impact of turbidity is unknown.

Disposition - We agree with this comment and the appropriate change has been made.

Comment - During drought periods, low flows in stream reaches below the reservoirs will be reduced if releases are not made.

Disposition - All of the tributary streams to the Walnut River within the watershed are classified as intermittent. Intermittent streams by their nature can be expected not to flow during drought periods. Therefore the reservoirs should not have any significant affect during these periods.

Comment - Agricultural production would not necessarily be foregone on 8,000 acres as stated for Alternative No. 4. Wildlife management would permit continuation of cropping on lands not subject to scour if cropping would enhance wildlife habitat. The cost of this alternative should be revised if the loss of agricultural production is included.

Disposition - The alternative as stated would create a public recreation and open space area by establishing native vegetation. It is possible some land within the area could be planted to crops to provide food for certain wildlife management practices, however, the type and emphasis of management for wildlife anticipated in this alternative precluded any agricultural production. We agree that cropping would be considered a significant tool in a situation where wildlife management is the primary objective. The cost of this alternative does not include agricultural production lost.

Department of Health, Education, and Welfare  
(Comments dated February 4, 1976)

Comment - It is respectfully recommended that the responsible persons in the project consult with the Kansas Department of Health and Environment in order to define, develop and implement a program of vector control which would conform to all state laws and regulations and that such programs be discussed in the final environmental impact statement.

Disposition - The Kansas Department of Health and Environment has been consulted and has stated they would provide technical assistance to the watershed district in a vector control program. Additional wording has been included in the operation and maintenance section of the plan that states the district's responsibility for vector control. The vector control program to be implemented by the sponsors will eliminate any adverse impact due to vector production. Therefore, the impact section has been modified accordingly.

Department of Transportation  
(Comments dated February 9, 1976)

Comment - There was no indication that a copy of the draft environment impact statement was sent to the Boating Administrator of the Kansas Forestry, Fish and Game Commission. We feel the Boating Administrator should be informed and consulted concerning this project. The recreational use of the lake at Structure No. 4 indicates that boater education and boating safety should have a role in the operation of the lake. If boat fueling facilities are to be provided, the need for the prevention and control of oil spills should be considered. Based on the

Environmental Protection Agency's present no discharge standard for marine sanitation devices, planning should also consider the need for sewage pump-out facilities for the recreational boats.

Disposition - Pursuant to this comment, the Boating Administrator for the Kansas Forestry, Fish and Game Commission has been informed and consulted concerning this project.

All state boating laws apply to this public recreation development, and education and enforcement fall under the responsibility of the Kansas Forestry, Fish and Game Commission. The sponsors of the recreation development will supplement this effort as needed. Boat fueling facilities will not be provided. Day use activity by small boating craft is planned for this small reservoir. The type of craft requiring sewage pump-out facilities will very rarely, if ever, use this lake. Should some use occur, the combination of short duration use and the Kansas holding tank requirements for boats will negate the need for pump-out facilities.

Environmental Protection Agency  
(Comments dated February 17, 1976)

Comment - The draft statement does not provide water quality data necessary to substantiate the reservoir's use for whole body contact recreation.

Disposition - The environmental impact statement does make reference to a letter from the Kansas Department of Health and Environment concerning water quality of the proposed reservoir for the planned recreation use. Subsequent to receiving these comments, a meeting was held with representatives of the Kansas Department of Health and Environment and the Environmental Protection Agency and it was agreed that specific responsibility should be added to the plan concerning water quality monitoring of the reservoir. This change has been made in the operation and maintenance section. The Kansas Department of Health and Environment also furnished an addendum to their August 1, 1975, letter. Both letters are included with the Environmental Protection Agency's comment letter in Appendix D.

Comment - The concentrated effect of stream flow patterns below reservoirs could result in periodic discharges having one or more of the following adverse characteristics: low dissolved oxygen, high organic load, high pesticide load and high nutrient load.

Disposition - No changes have been made in the environmental impact statement. Data and methodology do not exist to quantify the effects of scattered, small impoundments on downstream water quality. However, the concept of concentration is judged to be of minor significance in these impoundments. Most of the highly soluble constituents such as pesticides and nitrates will, although delayed, pass through the impoundments. Only very small amounts of bottom waters will be discharged and sediment sluicing is considered negligible. Any bottom releases are expected to regain normal dissolved oxygen levels within several hundred feet downstream of the principal spillway outfall. The organic load and water discharge peaks of flood flows will be diminished. The structures are designed to release 80 percent of detention waters within a ten day period.

Comment - Measures to control vector production should be discussed if production is significant.

Disposition - See disposition of Department of Health, Education and Welfare comments.

Comment - Secondary benefits described on pages I-35 and I-46 should be identified in the final environmental impact statement.

Disposition - Secondary benefits are defined in two categories. These are "stemming from" and "induced by" secondary benefits. The categories were identified by the Soil Conservation Service in its national economic analysis procedure as an estimate of project effects to the local trade community. The "stemming from" procedure is used to estimate the change in profits to transportation, processing, distribution, and related local businesses that handle the increased production stemming from the project. The "induced by" secondary benefit procedure is used to estimate the change in profits to those businesses supplying production input to producers benefited by the project.

Comment - The final statement should address the long-term measures to be implemented to provide flood protection as the proposed structures fill with sediment.

Disposition - Flood protection will be provided for the life of the project (100 years) without modification of the structures. Major modification of the structures after 100 years is not anticipated. The structures will continue to provide flood reduction after 100 years on a diminishing scale. After 100 years, minor amounts of sediment may be removed to assure continued functioning of the outlet works. Disposal of material will be in compliance with water quality standards at that time.

Comment - The final statement should identify who will be responsible for disposing of waste material collected from the recreational area and the method of disposal.

Disposition - Operation, maintenance, and replacement of recreational facilities as stated in the operation and maintenance section will be done by the City of Udall. The method of disposal will be the same as the city uses in disposal of normal city wastes.

Comment - The draft statement does not indicate if a determination has been made regarding permit requirements pursuant to Section 404 of the Federal Water Pollution Control Act, as amended (P.L. 92-500). We suggest the Corps of Engineers be consulted in this regard.

Disposition - Based on discussions of all watershed projects in Kansas with Corps of Engineers representatives, most watershed dams will not require permits since the streams on which they are located have less than five cubic feet per second flow more than 50 percent of the time. We believe that none of the Middle Walnut structures will require a permit.

A letter dated February 27, 1976, was sent to the Environmental Protection Agency's regional administrator with copies of revised pages showing those changes agreed to at the conference of February 23, 1976, with the Kansas Department of Health and Environment and the Environmental Protection Agency. It was agreed at the conference that the revisions would result in a favorable environmental impact statement rating. However, a letter from the Environmental Protection Agency's regional administrator dated March 25, 1976, expressed continued concern about the adequacy of water quality data presented in the environmental impact

statement. A copy of this letter was sent to the Kansas Department of Health and Environment. In a letter dated April 2, 1976, the Kansas Department of Health and Environment again expressed belief that the water quality analysis is adequate. On April 8, 1976, a letter was sent to the Environmental Protection Agency's regional administrator expressing SCS's belief that water quality concerns were appropriately covered during the planning process and that further delay in completion of the plan/EIS was not warranted. The letter outlined a series of actions intended to be responsive to the Environmental Protection Agency concerns before project construction begins. The aforementioned exchange of correspondence is included in Appendix D.

United States Department of Interior  
(Comments dated March 5, 1976)

Comment - Although the estimated annual recreation visitation of 50,000 is reasonable, recreation benefits of \$112,500 (page I-18, paragraph 5) are not explained. Reviewers should be provided with an explanation of how this value is derived.

Disposition - A value of \$2.25 per recreation visit in accordance with the Water Resources Council, Principles and Standards for Planning Water and Related Land Resources as published in the Federal Register dated September 10, 1973, was used in computing recreational benefits.

Comment - While it is clear that an archeological inventory has been conducted at all proposed sites, the environmental impact statement should provide further assurance that all other sites involving surface modification caused by utility line installations, borrow areas, dikes and recreational facilities have been similarly surveyed.

Disposition - All surface disturbance except the recreational facilities will occur within the proposed reservoir sites and, therefore, have been considered. At the multipurpose structure the area beyond the reservoir area involving recreational facilities was also considered by the investigating archeologists.

Comment - We suggest the environmental impact statement acknowledge that the area may have potential for chemical and metallurgical grade limestone.

Disposition - The environmental impact statement "Watershed Resources - Environmental Setting" section page II-16, has been modified to acknowledge this potential.

Comment - Not all land treatment is beneficial to wildlife population. For example, removal of brushy draws for installation of grassed waterways results in a reduction in winter cover. Construction of detention dams built under land treatment eliminates terrestrial wildlife habitat. The various trade-offs caused by altered habitat should be recognized.

Disposition - The environmental impact statement "Environmental Impact - Conservation Land Treatment" section has been modified as suggested.

Comment - Suggest you delete the sentence on page II-41 stating that invertebrates will be driven from inundated areas but will quickly return as water recedes.

Disposition - The environmental impact statement has been modified as suggested.

Comment - We believe the environmental impact statement should evaluate the effects of the proposed structures on ground water levels and quality of water.

Disposition - The environmental impact statement has been modified to state that structures will have no significant effect on ground water levels or quality. Refer to disposition of Environmental Protection Agency comments regarding reservoir impact on downstream water quality.

Comment - The purpose of the structures would be to retain flood-water. It would appear that their effect would be to reduce high flows and spread the flows as medium flows over one extended period. The last sentence in paragraph 2 of page II-42 does not give this impression.

Disposition - The statement referred to was intended to address in-channel flows rather than flood flows or out-of-channel flows. Clarification has been made on page II-42.

Comment - Alternative No. 4 does not appear to eliminate adverse effects (relocating 62 persons, removing 25 dwellings, and foregoing agricultural production on 8,000 acres) as indicated by the table on page II-48.

Disposition - Alternative No. 4 was considered for the purpose of eliminating or reducing impacts on the natural environment caused by installation of reservoir type structures. Economic or social impacts were not considered a part of the natural environment.

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11. Kansas State Department of Health and Environment, Division of Environment, Personal Communication, August 1, 1975.

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24. Comprehensive Plan for Butler County, Kansas, Published 1973; Watershed Plan Element, adopted January 1974.

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26. Kansas State Board of Health, Water Quality Criteria for Interstate and Intrastate Waters of Kansas, 1973.
27. State of Kansas Department of Health and Environment, Kansas Water Quality Inventory Report, 1975.
28. Archeological Survey and Inventory of the Middle Walnut Watershed Area of Butler, Cowley, Sedgwick, and Sumner Counties, South-Central Kansas, by Mike Barton and Mark Baumler, 1975.
29. Kansas State Historical Society, personal communications, November 6, 1975, and November 10, 1975.



LIST OF APPENDIXES

Appendix A - Comparison of Benefits and Costs for Structural Measures

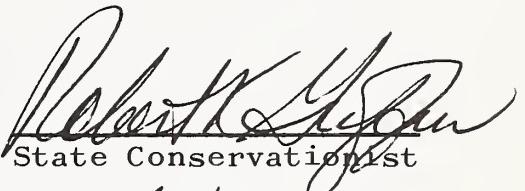
Appendix B - Description of Conservation Practices for Resource Management Systems

Appendix C - Facilities to be Installed at the Recreational Development

Appendix D - Letters of Comment on Draft Environmental Impact Statement

Appendix E - Typical Earth Dam With Pipe Drop Inlet Recreation Development and Project Maps

Approved by

  
Robert W. Johnson

State Conservationist

  
Date



## APPENDIX A

### COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES



COMPARISON OF BENEFITS AND COSTS FOR STRUCTURAL MEASURES

Middle Walnut Watershed, Kansas

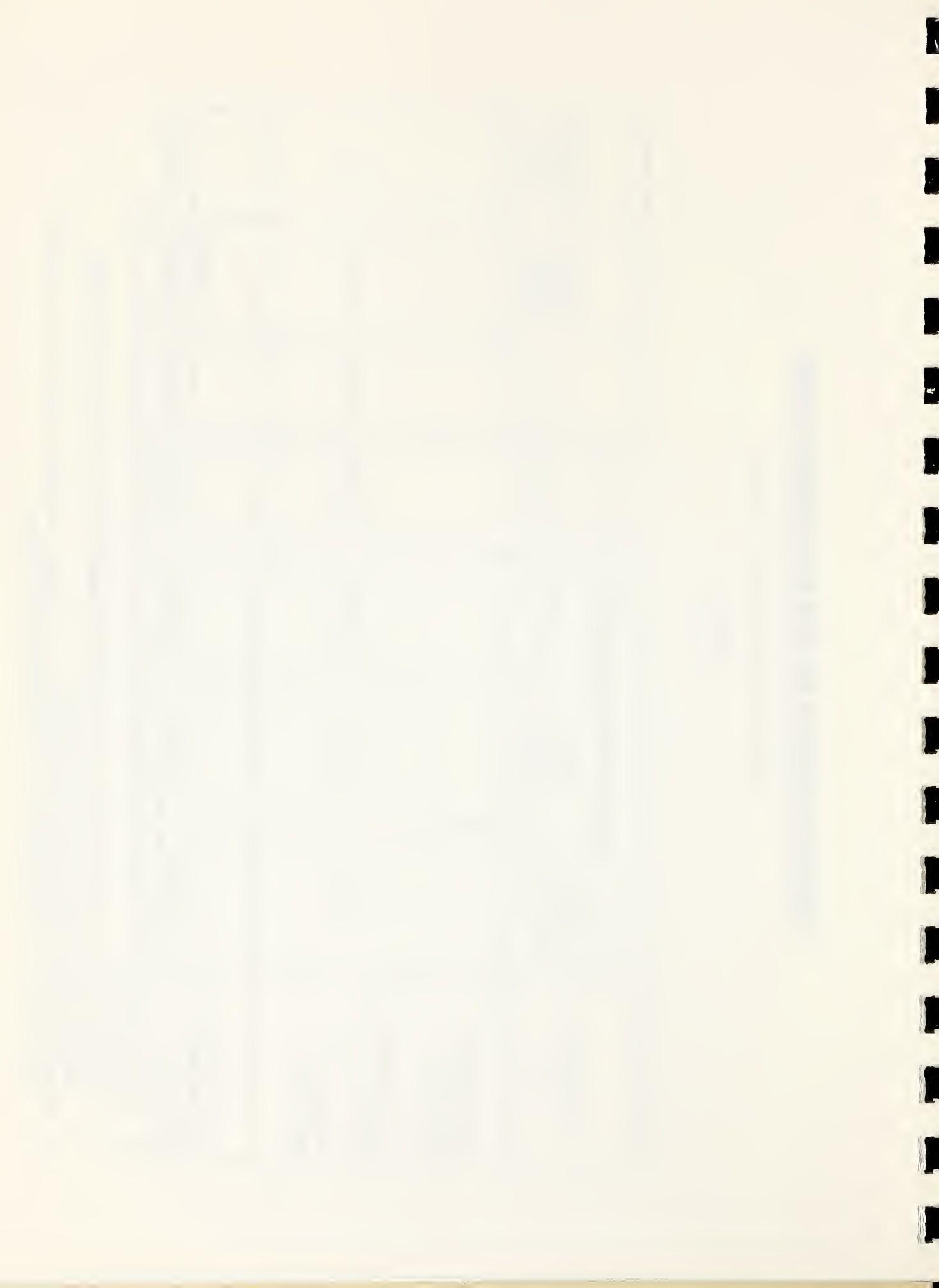
(Dollars)

| Evaluation Unit                                       | Average Annual Benefits <sup>a/</sup> |                         |                | Secondary Total | Average Annual Cost <sup>c/</sup> | Benefit Cost Ratio   |
|---|---------------------------------------|-------------------------|----------------|-----------------|-----------------------------------|----------------------|
|   | Damage Reduction <sup>b/</sup>        | More Intensive Land Use | Recreation     |                 |                                   |                      |
| 14 Floodwater Retarding Structures,                   |                                       |                         |                |                 |                                   |                      |
| 1 Multipurpose Structure, and Recreational Facilities | 126,300                               | 33,100                  | 112,500        | 52,000          | 323,900                           | 192,200 1.7:1        |
| Project Administration                                |                                       |                         |                |                 |                                   | 41,200               |
| <b>GRAND TOTAL</b>                                    | <b>126,300</b>                        | <b>33,100</b>           | <b>112,500</b> | <b>52,000</b>   | <b>323,900</b>                    | <b>233,400 1.4:1</b> |

a/ Current price base except agricultural base which utilizes WRC normalized prices issued October 1974.

b/ In addition it is estimated that land treatment measures will provide flood damage reduction benefits of \$37,700 annually.

c/ Price base 1974. 100 years at 5 7/8 percent interest. Includes \$18,700 for operation, maintenance, and replacement of recreational facilities.



## APPENDIX B

DESCRIPTION OF CONSERVATION PRACTICES

FOR

RESOURCE MANAGEMENT SYSTEMS



## CONSERVATION PRACTICES FOR RESOURCE MANAGEMENT SYSTEMS

Conservation Cropping System: Using needed cultural and management measures for crops. Cropping systems include rotations that include grasses and legumes as well as rotations in which the desired benefits are achieved without these crops.

Stubble Mulching: Managing plant residue on a year-round basis in which harvesting, tilling, planting, and cultivating are performed to keep protective amounts of vegetation on the soil surface.

Minimum Tillage: Limitation of cultivation to that essential to crop production and prevention of soil loss.

Gradient Terraces: A system of earth embankments, ridges and channels, constructed along a slope at a suitable spacing and with an acceptable grade.

Diversion: A channel with a supporting ridge on the lower side constructed across a slope. Diversions are constructed to protect land lower on a slope from excessive runoff from land above the diversion.

Contour Farming: Cultivation of sloping land at right angles to the slope. This includes following established grades of terraces, diversions, or contour strips.

Grassed Waterway or Outlet: A natural or constructed passage-way for water with vegetation established that is suitable for safe disposal of runoff from a field, diversion, terrace, or other structure.

Drainage: Disposal of excess water in a field by grading to reshape the land surface or by construction of a graded ditch.

Proper Grazing Use: Grazing at an intensity which will maintain enough cover to protect the soil and maintain or improve the quality and quantity of desirable vegetation. This can be accomplished by stocking at rates compatible with forage production where summer-long grazing is practical or by rotating grazing use between two or more pastures. Cropland forage to produce seasonal pasture, hay, or silage can be planned to supplement rangeland pastures.

Planned Grazing Systems: A system in which two or more grazing units are alternately rested from grazing in a

planned sequence over a period of years. The rest period may be throughout the year or during part of the growing season of the desirable plants. Many pastures in the watershed contain sufficient amounts of desirable plants to recover rapidly through periodic deferments.

Brush Management: Manipulation of stands of brush by mechanical, chemical, or biological means, or by controlled burning. This includes reducing excess brush and weeds to restore natural plant community balance and manipulation of brush stands through selective and patterned control methods to meet specific needs of the land and objectives of the land user.

Range Seeding: Establishing adapted plants by seeding on rangeland.

Pond: A water source for livestock made by constructing a dam or embankment, or by excavating a pit.

Detention Dam: A dam or embankment which temporarily detains floodwater to regulate the rate of flow in a watercourse.

Woodland Improvement: This may include harvesting mature trees, removing poor quality or less desirable trees, and pruning the managed species.

Windbreak and Shelterbelt Planting and Renovation: Planting tree and shrub seedlings to establish new, or renovate existing shelterbelts and windbreaks. Renovation may also include the removal or pruning of existing plants or the adoption of improved management practices.

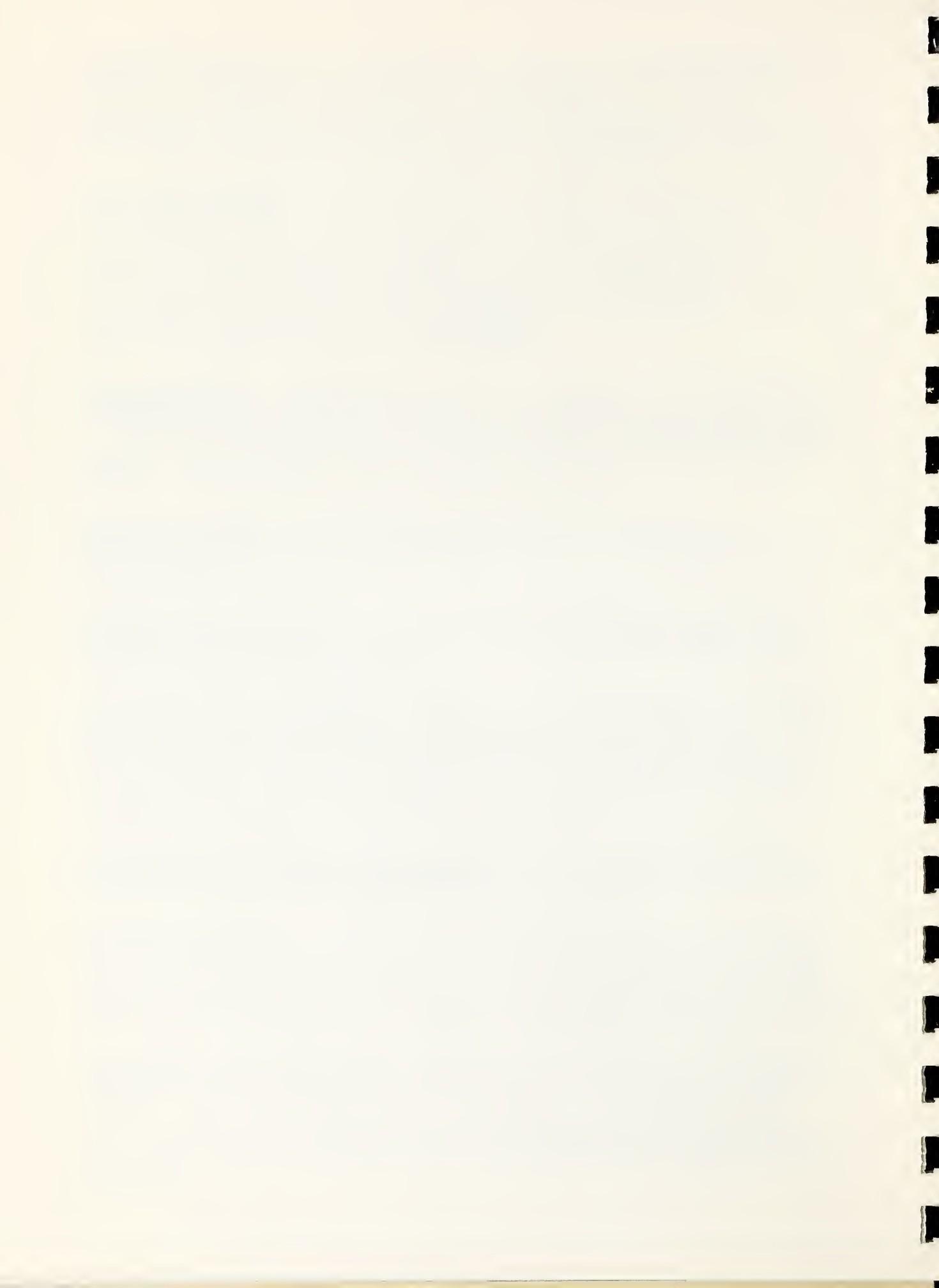
Hedgerow Replacement or Renovation: Hedge seedlings may be planted to establish permanent field borders and add to wildlife habitat and landscape beautification.

Grazing Control: Grazing can damage young trees and cause soil erosion and compaction. All new plantings and cultural operations should be protected from grazing livestock. Some good quality young native timber also needs protective fencing.

Tree and Shrub Plantings: Special shelterbelt plantings are planned at each flood control structure to break up summer winds. These plantings will be planned to maximize their value for wildlife habitat, recreation shelter, and site beautification. Plantings in other areas will serve similar purposes.

## APPENDIX C

### FACILITIES TO BE INSTALLED AT THE RECREATIONAL DEVELOPMENT



## FACILITIES TO BE INSTALLED AT THE RECREATIONAL DEVELOPMENT

Access Roads: Surfaces will be gravel comparable to all-weather county roads. All roads will be constructed on the contour to the extent practical.

Two-Way: A 24-foot wide road will provide access to the general recreational area as well as to the bathhouse - comfort station and the boat ramp. A total of 3,800 feet of this type road will be built.

One-Way: A one-way road is planned for the circular camping areas. This road will be 15 feet wide and 1,200 feet long.

Picnic Tables: Twenty-picnic tables with steel frames and treated wood tops and benches will be distributed within the recreational area. The tables will be 8 feet long with benches on both sides.

Grills: Ten waist-high metal grills suitable for use with either wood or charcoal will be installed. One or two fireplaces will be provided. Fireplaces will be constructed of iron, brick, stone, or concrete.

### Sanitary Facilities:

Refuse Barrels: Suitable containers will be provided to dispose of garbage and other refuse within the recreational area. Sufficient quantities (generally one per two campsites and one for two or three picnic tables) to hold several days refuse will be provided.

Comfort Station: A comfort station with showers will be provided to serve the campground. It will be constructed of concrete block with concrete floor and four toilets, two lavatories, and four showers on the women's side and three toilets, 1 urinal, four lavatories, and four showers on the men's side. Plastic or fiberglass sky lights will be used in the roof.

Bathhouse: The bathhouse and comfort station will be of a similar construction. It will have three toilets, two lavatories, and four showers on the women's side and two toilets, one urinal, two lavatories, and four

showers on the men's side. The change area on both sides will have a partial open top. The center portion will be utilized as a checkroom for swimmers clothing.

Vault Type Toilets: Two two-unit vault type toilets will be installed. They will be concrete block structures with corrugated fiberglass, heat resistant roofs. Sunlight will light the interiors during the day and outside mercury lights will light interiors at night. In each toilet three seats on the women's side and two seats and one urinal on the men's side will be installed. One of these toilets will be located near the nature trail and wildlife management area. Parking for 20 vehicles will be provided at this site. The other toilet will be near the picnic areas.

Water Supply: Water supply will be obtained by connection to the existing city supply. Connection to the existing supply will require 3,600 feet of water line. Water will be provided only at the bathhouse - comfort station.

Sand Beach: The beach and swimming area will be graded and shaped prior to impoundment of water in the reservoir. Twelve inches of sand will be provided over 35,000 square feet of beach and swimming area. A parking area to accommodate 50 vehicles will be located nearby.

Campground: Trailer spurs and tent pads will be provided for 30 units. An electrical and sewer hook-up will be available at each trailer spur. Trailer spurs and tent pads will be graveled. Each trailer site will also have a picnic table, grill, and refuse barrel. A separate sewage dump station will be provided.

Picnic Shelters: A concrete slab floor about 20 by 20 feet will be installed with steel pipe supports for a wood or plastic roof. The roof shall be slightly larger than the floor. Three of these units will be installed.

Electrical Utilities: The extension of a nearby power supply to the recreational area is anticipated. A connecting line 4,000 feet long is required. Buried cable will be used for outlets. Security lighting will be provided at the bathhouse - comfort station, picnic, and camping areas.

Boat Ramp: A concrete boat ramp will be constructed. A graveled parking area for 15 vehicles with trailers will be provided.

Boat Dock: A 6- x 32-foot floating dock, constructed of steel and foam, will be anchored adjacent to the boat ramp.

Signs: Entrance and directional signs will be constructed from metal or wood with lettering that will meet county highway standards. These will be placed at strategic locations to regulate, direct, or inform users of the area.

Parking Area: A parking area will be provided for 50 vehicles. This facility is additional to parking areas mentioned in connection with other facilities. Vehicles will be restricted in all parking areas by mechanical barriers. All parking areas will be of the same quality as roads.

Landscaping: Landscaping for shade, utility, and beauty will be completed throughout the recreational area.

Sewage System: Sewage from the comfort station and bath-house will gravity flow into a two-cell lagoon system. This will eliminate the need and expense of sewage lift pumps. The lagoons will be designed to contain all effluents. If over use should produce too much effluent, the excess will be removed and transported to another sewage system. The lagoon will be enclosed with a chain-link fence.

Nature Trail: A 6,000-foot nature trail will be constructed of wood chips. Wood chips will be obtained from trees removed from the impoundment site. The trail will be located in the wildlife management area.

Fencing: Fencing to protect certain areas, or to direct activities to certain areas, will be provided as needed.

Total design capacity at the recreational site is shown in the following table:

| <u>No. of Facility</u>              | X | <u>Visitors/<br/>Vehicle</u> | X | <u>Turnover</u> | = | <u>Visitor<br/>Days</u> |
|-------------------------------------|---|------------------------------|---|-----------------|---|-------------------------|
| 30 Campsites                        | X | 3.6                          | X | 1               | = | 108                     |
| 20 Picnic Tables                    | X | 3.6                          | X | 2               | = | 144                     |
| 52 Vehicles<br>(Swimmers)           | X | 3.6                          | X | 2               | = | 375                     |
| 17 Vehicles<br>(Fishermen)          | X | 3.6                          | X | 2               | = | 125                     |
| 10 Vehicles<br>(Sightseers)         | X | 3.6                          | X | 6               | = | 215                     |
| 5 Vehicles<br>(Boaters)             | X | 3.3                          | X | 2               | = | 33                      |
| Designed Use (Weekend Visitor Days) |   |                              |   |                 | = | 1,000                   |

## APPENDIX D

LETTERS OF COMMENT ON  
DRAFT ENVIRONMENTAL IMPACT STATEMENT





DEPARTMENT OF THE ARMY  
OFFICE OF THE ASSISTANT SECRETARY  
WASHINGTON, D.C. 20310

Honorable Robert W. Long  
Assistant Secretary of Agriculture  
Washington, D. C. 20250

Dear Mr. Long:

In compliance with the provisions of Section 5 of Public Law 566, 83d Congress, the State Conservationist, by letter dated 4 December 1975, requested the views of the Secretary of the Army on the Watershed Work Plan and Draft Environmental Impact Statement for Middle Walnut Watershed, Kansas.

We have reviewed the work plan and foresee no conflict with any projects or current proposals of this Department.

The draft environmental impact statement is considered satisfactory.

Sincerely,

Charles R. Ford  
Deputy Assistant Secretary of the Army  
(Civil Works)

bc:

R. K. Griffin, SCS, Salina, Kansas





# United States Department of the Interior

OFFICE OF THE SECRETARY  
WASHINGTON, D.C. 20240

PEP ER-75/1187

MAR 5 1976

Dear Mr. Griffin:

Thank you for the letter of December 4, 1975, requesting our views and comments on the work plan and draft environmental statement for Middle Walnut Watershed, Butler, Cowley, Sedgwick and Sumner Counties, Kansas. Our comments on the documents follow.

### General Comments

Our Fish and Wildlife Service issued a report on the watershed in February 1971 which outlined measures necessary to mitigate wildlife habitat losses expected as a result of construction of the floodwater detention structures. Project sponsors agreed to install the mitigation measures. Short term losses of wildlife habitat will occur during construction but significant long term losses should not occur if the mitigation measures are maintained for the life of the project.

### Work Plan

Although the estimated annual recreation visitation of 50,000 is reasonable, recreation benefits of \$112,500 (page I-18, paragraph 5) are not explained. Reviewers should be provided with an explanation of how this value was derived.

### Environmental Statement

We are pleased to note (pages II-11, II-24, II-44), that the Middle Walnut Watershed Joint District No. 60 and the U.S. Department of Agriculture have instituted appropriate procedures to locate and identify cultural resources within the project area.

While it is clear that an archeological inventory has been conducted at all proposed reservoir sites, the statement should provide further assurance that all other sites involving surface modification caused by utility line installations, borrow areas, dikes, and recreational facilities have been similarly surveyed.



Known mineral resources of the area include petroleum, natural gas, limestone, and sand and gravel. The statement recognizes the existence of petroleum, natural gas, stone quarries, sand and gravel pits, and pipelines in the area and states that "None of these resources will be affected by installation of the works of improvement proposed in the plan." However, the document does not explain that limestone in the area may be of chemical and metallurgical grade. For example, the Fort Riley Limestone, exposed in the watershed, contains more than 95 percent  $\text{CaCO}_3$  in exposures east of the watershed. It also may have a  $\text{CaCO}_3$  content greater than 95 percent within the watershed. We suggest that subsequent drafts of the document acknowledge that the area may have potential for chemical and metallurgical grade limestone.

Page II-35

Not all land treatment is beneficial to wildlife populations. For example, removal of brushy draws for installation of grassed waterways results in a reduction of winter cover. Construction of detention dams built under land treatment eliminates terrestrial wildlife habitat. The various tradeoffs caused by altered habitat should be recognized.

Page II-41

Suggest you delete the 2nd sentence in the 3rd paragraph. Many terrestrial invertebrates without the capability of flight would perish during inundation of the reservoir floodpools. Those areas would probably be recolonized by new individuals. However, changes in vegetative composition could alter invertebrate species composition.

Page 42

We believe the environmental statement should evaluate the effects of the multiple-purpose structure on ground-water levels and that it should also consider any impacts of the detention reservoirs on ground-water levels and quality of water.

Page II-42, Second Paragraph

The purpose of the structures would be to retain floodwater. It would appear that their effect would be to reduce high flows and spread the flows as medium flows over an extended period of time. The last sentence in the paragraph does not give this impression.

Page II-49, Alternative No. 4

Relocating 62 persons, removing 25 dwellings, and foregoing agricultural production from 8,000 acres of land seem to be adverse impacts. Therefore, the alternative does not appear to eliminate adverse impacts as indicated by the table on page II-48.

We hope these comments and suggestions will be of assistance to you.

Sincerely yours,



Acting Assistant Secretary of the Interior

Mr. Robert K. Griffin  
State Conservationist  
Soil Conservation Service  
Department of Agriculture  
Post Office Box 600  
Salina, Kansas 67401



**UNITED STATES DEPARTMENT OF COMMERCE**  
**The Assistant Secretary for Science and Technology**  
Washington, D.C. 20230

February 2, 1976

Mr. Robert K. Griffin  
State Conservationist  
Soil Conservation Service  
Department of Agriculture  
P. O. Box 600  
Salina, Kansas 67401

Dear Mr. Griffin:

This is in reference to your draft environmental impact statement entitled "Middle Walnut Watershed, Kansas." The enclosed comments from the National Oceanic and Atmospheric Administration are forwarded for your consideration.

Thank you for giving us an opportunity to provide these comments, which we hope will be of assistance to you. We would appreciate receiving four (4) copies of the final statement.

Sincerely,

Sidney R. Galler  
Deputy Assistant Secretary  
for Environmental Affairs

Enclosure - Memo from National Weather Service, December 24, 1975





**U.S. DEPARTMENT OF COMMERCE**  
**National Oceanic and Atmospheric Administration**  
NATIONAL WEATHER SERVICE  
Silver Spring, Md. 20910

DEC 24 1975

Date : DEC 24 1975

Reply to Attn. of: W2x2/AF

To : Dr. William Aron  
Director, Office of Ecology and Environmental Conservation (EE)

From : Dr. George P. Cressman  
Director, National Weather Service (W) *RGS*

Subject: DEIS 7512.26 - Middle Walnut Watershed

On pg II-13 Flash Floods are indicated as often occurring in summer, but no reference is made to the available NWS forecast service. This area is under the Wichita WSFO and flash flood watch and warning services are available in addition to long range weather radar coverage to provide people along these rivers with early alerts of flash floods. These services are described in the attachment and should be reflected in the report.

Atch.

## FLASH FLOOD PROGRAM

In many communities the interval between heavy rainfall and flooding is too short for forecast preparation by the RFC. This generated the need for the present Flash Flood Program.

Three alternate methods are used to prevent loss of life and alleviate property damage in flash flood situation. These are: 1) self-help forecast procedures 2) Flash Flood Alarm Systems (FFAS), and 3) generalized flash flood watches and warnings. Selection of a method for a specific community depends on the hydrologic nature of the problem in that area. In some cases a combination of methods is used.

With the first method, a forecast procedure prepared by NWS officials is provided to a community official. He collects rainfall data and prepares the official forecasts required.

The FFAS is a specialized river gage which senses a pre-selected critical water level and sounds an alarm. The alarm portion of FFAS's is placed in some disaster oriented office, such as a police station which is always manned around the clock. Disaster officials warn endangered citizens and monitor upstream conditions to get an idea of the stage to be expected.

Areas which cannot be served by either of these methods must rely on flash flood watches and warnings. The watch means that conditions conducive to flooding are expected. Interested parties should stay informed and ready for immediate action if a warning is received or flooding is observed. The warning means that flooding is imminent or in progress and low areas should be evacuated immediately.

The success of any natural disaster warning program is dependent on community preparedness and pre-designed plans of action.



DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

REGION VII

FEDERAL BUILDING

601 EAST 12TH STREET

KANSAS CITY, MISSOURI 64106

February 4, 1976

OFFICE OF  
THE REGIONAL DIRECTOR

Mr. Robert K. Griffin  
State Conservationist  
U.S. Department of Agriculture  
Soil Conservation Service  
P. O. Box 600  
Salina, Kansas 67401

RE: Draft Environmental Impact Statement  
Middle Walnut Watershed, Kansas

Dear Mr. Griffin:

Thank you for the opportunity to review and comment on the above referenced document.

We note that it is proposed that there be constructed, at a predetermined location, a system of fourteen floodwater retarding structures and one multipurpose floodwater retarding and recreational water supply structure with recreational facilities which will include camping and picnicking sites, boat docks and ramps, sanitary and waste facilities and a swimming beach. We are pleased to note that such facilities "will be designed and installed" to be usable by the physically handicapped.

It is our understanding from the Environmental Statement page II-17 that the floodwater retarding structures are located within a watershed having an estimated population of 37,496 of which 31,531 are considered urban. Further it is estimated that the population within the watershed will increase to an estimated 73,000 within the next 50 years.

On page II-41 we note that there is mention of invertebrates, such as mosquitoes, flies, ticks and mites. Various species of mosquitoes and flies breed in small ponds and depressions and there is the possibility that these species may increase around reservations under proper conditions. The greatest increase would probably follow reservoir drawdown after a period of high runoff leaving numerous small bodies of water where mosquitoes and flies could reproduce. It is also stated that a net decrease in these populations is expected, due to control of flood waters and a decrease in these populations is expected, due to control of flood waters and a decrease in flooded depressions along streams.

Mr. Robert K. Griffin

February 4, 1976

Again on page II-46 under "Adverse Environmental Effects", it is stated that some disease vectors and other pestiferous invertebrates are likely to increase around reservoirs.

We also note that there will be numerous recreational facilities associated with the project.

In view of the large population in the proximity to the watershed, the relatively large population within the watershed, and the potential extensive use of the recreational areas, we find no discussion of an implementation plan for vector control either on privately owned or public impoundments financed by this project.

It is respectfully recommended that the responsible persons in the project consult with the Kansas Department of Health and Environment in order to define, develop and implement a program of vector control which would conform to all state laws and regulations and that such programs be discussed in the final Environmental Impact Statement.

Sincerely,

  
William H. Henderson  
Regional Environmental  
Officer

cc: S. A. Boudreaux, PHS  
Frances Wharton, Office of  
Environmental Affairs



DEPARTMENT OF TRANSPORTATION  
UNITED STATES COAST GUARD

MAILING ADDRESS:  
U.S. COAST GUARD (G-WS/73)  
400 SEVENTH STREET SW.  
WASHINGTON, D.C. 20590  
PHONE: 202-426-2262

• 9 FEB 1976

Mr. Robert K. Griffin  
State Conservationist  
Soil Conservation Service  
P. O. Box 600  
Salina, Kansas 67401

Dear Mr. Griffin:

This is in response to your letter of 4 December 1975 concerning a draft environmental impact statement for the Middle Walnut Watershed, Butler, Cowley, Sedgwick and Sumner Counties, Kansas.

The concerned operating administrations and staff of the Department of Transportation have reviewed the material submitted. The Coast Guard commented as follows:

"The subject statement discusses the proposed construction of 14 flood water retarding structures and 1 multi-purpose flood water retarding recreation structure with recreation facilities at Structure No. 4.

The recreational use of the lake at Structure No. 4 indicates that boater education and boating safety should have a role in the operation of the lake. If boat fueling facilities are to be provided, the need for the prevention and control of oil spills should be considered. Based on the Environmental Protection Agency's present no discharge standard for marine sanitation devices, planning should also consider the need for sewage pump-out facilities for the recreational boats.

There was no indication that a copy of the draft EIS was sent to the Boating Administrator of the Kansas Forestry, Fish and Game Commission. We feel the Boating Administrator should be informed and consulted concerning this project."

The Department of Transportation has no other comments to offer nor do we have any objection to this project. The final statement however should address the concerns of the Coast Guard.

The opportunity to review this draft statement is appreciated.

Sincerely,

A handwritten signature in cursive ink, appearing to read "D. J. Riley".

D. J. RILEY  
Captain, U. S. Coast Guard  
Deputy Chief, Office of Marine  
Environment and Systems  
By direction of the Commandant



UNITED STATES  
ENVIRONMENTAL PROTECTION AGENCY

REGION VII  
1735 BALTIMORE  
KANSAS CITY, MISSOURI - 64108

February 17, 1976

Mr. Robert K. Griffin  
State Conservationist  
U.S. Department of Agriculture  
Soil Conservation Service  
P.O. Box 600  
Salina, Kansas 67401

Dear Mr. Griffin:

Middle Walnut Watershed; Butler, Cowley,  
Sedgwick and Sumner Counties, Kansas

We have reviewed the Draft Environmental Impact Statement for the project identified above. The statement has been rated "3" (inadequate). This rating means we believe the statement does not adequately assess the environmental impacts of the proposed project. Our primary concern is the failure of the draft statement to provide adequate water quality data. We request the following concerns receive further consideration in the final statement.

Water Quality

As indicated in the draft statement, the proposed multi-use reservoir will be developed on Stewart Creek. This reservoir is expected to receive 50,000 annual recreation visits, 30 percent of which are expected to involve swimming. However, the draft statement did not provide the water quality data necessary to substantiate the reservoir's use for whole body contact recreation. This data should be presented in the final statement. Of particular concern are the pollutants associated with agricultural runoff (e.g., fertilizers, feed lot waste and pesticides) and the effluent discharge from the City of Udall, Kansas.

The statement does not assess the effects of the proposed impoundments on the stream flow patterns or water quality below the outlet works. Of particular concern is the concentrating effect these reservoirs will have on plant nutrients and pesticides. This concentrating effect could result in periodic discharges having one or more of the following adverse characteristics: low dissolved oxygen, high organic load, high pesticide load and high nutrient load.

General Comments

The statement does not address the potential for disease vector production in the reservoirs to be constructed. If this concern will be significant, measures to control vector production should be addressed in the final statement.

Reference is made to secondary project benefits on pages I-35 and I-46. These benefits should be identified in the final environmental impact statement.

The draft statement indicates that, as a result of the flood protection provided by the proposed project, rural area development will be advanced. Since the functional life of the proposed structure is finite, the final statement should address the long-term measures to be implemented to provide flood protection as the proposed structures fill with sediment. Of particular concern are the environmental impacts which may result from maintenance activity such as dredging, if the reservoir pools concentrate pesticides and plant nutrients.

Solid waste from the proposed recreation facilities around the multipurpose reservoir will be collected in suitable containers. The final statement should identify who will be responsible for disposing of this material and also identify the disposal methods.

The draft statement does not indicate if a determination has been made regarding permit requirements pursuant to Section 404 of the Federal Water Pollution Control Act, as amended (P.L. 92-500). We suggest the Corps of Engineers be consulted in this regard.

We appreciate the opportunity to review this draft statement. Please forward three copies of the final environmental impact statement to this office when it is submitted to the Council on Environmental Quality. If we can be of assistance in resolving the aforementioned concerns, please contact our office.

Sincerely yours,

*C.V. Wright*  
for Jerome H. Svore  
Regional Administrator

# DEPARTMENT OF HEALTH AND ENVIRONMENT

DWIGHT F. METZLER, Secretary

Topeka, Kansas 66620



August 1, 1975

Mr. John W. Reh  
River Basin - Watershed  
Planning Staff Leader  
Soil Conservation Service, U.S.D.A.  
Box 600  
Salina, Kansas 67401

Dear Mr. Reh:

This letter is in response to your letter of July 10, 1975 in which you requested our determination of water quality in the proposed recreation reservoirs in the Wet Walnut and Middle Walnut Watersheds. It is our opinion that the impoundments at sites No. 1,4,32 and 34 on the Wet Walnut and site No. 4 on the Middle Walnut Watershed will meet Class A Water Quality Standards except during periods of surface runoff. However, we do not anticipate designating the lake as a body contact area until sufficient recreational intensity is demonstrated.

If we can provide further assistance, please contact us.

Sincerely,

Division of Environment

John L. Travers, P.E.  
Sanitary Engineer  
Water Quality Planning and  
Surveillance Section

JLT:gd

*State of Kansas . . . ROBERT F. BENNETT, Governor*

# DEPARTMENT OF HEALTH AND ENVIRONMENT

DWIGHT F. METZLER, *Secretary*

Topeka, Kansas 66620



February 25, 1976

Mr. John W. Reh  
River Basin - Watershed Planning  
Staff Leader  
Soil Conservation Service, U.S.D.A.  
P.O. Box 600  
Salina, Kansas 67401

Re: Middle Walnut  
Wet Walnut Watersheds

Dear Mr. Reh:

This letter is a response to our meeting of February 23, 1976, concerning the above Watershed Projects and is written as an addendum to our letter of August 1, 1975. We wish to reiterate our support for these projects, and their proposed recreational uses, with the following statements:

1. As was stated in the meeting, our office has learned through many years of stream water quality monitoring that predictions of the water quality in proposed impoundments can best be made by analyzing the various potential sources of pollutants within a given watershed along with review of long-term water quality records in the general area of the proposed structure. This is opposed to the very limited technique of gathering short-term water quality data for a specific Watershed Project. Historical data for similar projects, soil erodibility factors, fertilizer application rates, etc. may be used in support of this basic technique. It is our opinion that this approach gives the best possible prediction of proposed impoundment water quality. If it is our conclusion during review of a watershed project that specific water quality sampling should be undertaken prior to project commencement, we will recommend such a program in our review comments to your agency.
2. We feel that State enforcement of the Kansas Water Pollution Control Statutes and PL 92-500 through NPDES will provide assurance that no point-sources within any of the watersheds will deteriorate impoundment water quality below Class A standards.
3. Our records indicate no industrial or feedlot point sources above any of the proposed multi-purpose structures.

Mr. John W. Reh  
February 25, 1976  
Page 2

4. Our records indicate that the City of Udall has a Non-Discharging Permit to operate a waste treatment plant above structure #4 on the Middle Walnut. We feel that their State Non-Discharge Permit provides assurance that water quality in this reservoir will not be impaired by this facility.
5. Our records indicate that the City of Brownell has proposed a non-discharging waste treatment plant above structure #32 on the Wet Walnut. We feel that the State Non-Discharge Permit will provide assurance that water quality in this reservoir will not be impaired.
6. With regard to non-point sources, our past experience has shown that Class A Standards would not be violated on the impoundments in question except during periods of high surface runoff. This judgement is based upon the following factors:
  - a) Weekly monitoring at similar impoundments;
  - b) Detailed studies of similar impoundments subject to only non-point source influence;
  - c) Periodic Comprehensive Basin Surveys throughout the State;
  - d) Periodic Comprehensive Lake Surveys throughout the State; and
  - e) Analyses of the State-wide Streamflow Network data over a long-term period.

To reiterate, then, on the basis of the above factors, it is our opinion that the impoundments at Sites No. 1, 4, 32, and 34 on the Wet Walnut and Site No. 4 on the Middle Walnut Watershed will meet Class A Water Quality Standards except during periods of high surface runoff. However, we do not anticipate designating these lakes as body contact areas until sufficient recreational intensity is demonstrated. We would suggest that you obtain assurance from the lake sponsors that they undertake a weekly lake water quality monitoring program during the swimming season.

We sincerely hope that this information will be adequate for your needs. If we can be of further service, please let us know.

Sincerely yours,

Division of Environment



John L. Travers, Chief  
Monitoring and Surveillance Unit

P. O. Box 600, Salina, Kansas 67401

February 27, 1976

Mr. Jerome H. Svore  
Regional Administrator  
Attn: Ed Vest  
Environmental Protection Agency  
1735 Baltimore  
Kansas City, Missouri 64108

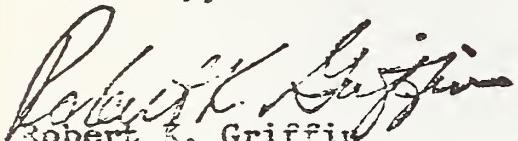
Dear Mr. Svore:

Thank you for providing comments on the Middle Walnut Watershed project Draft Environmental Impact Statement.

We are providing you copies of those plan and environmental impact statement pages showing revisions that have been made appropriate to your comments. The added pages of the consultation section of the environmental impact statement showing substantive comments and their disposition are also enclosed.

This Principles and Standards phase-in plan is behind schedule, therefore we request your urgent consideration of these revisions.

Sincerely,

  
Robert K. Griffin  
State Conservationist

Enclosures



# UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VII  
1735 BALTIMORE — ROOM 249  
KANSAS CITY, MISSOURI 64108

March 25, 1976

Mr. Robert K. Griffin  
State Conservationist  
Soil Conservation Service  
U.S. Department of Agriculture  
P.O. Box 600  
Salina, Kansas 67401

Dear Mr. Griffin:

We have reviewed the materials enclosed with your February 27, 1976, letter regarding the Draft Environmental Impact Statement (EIS) for the proposed Middle Walnut Creek Watershed Project. At this time, we cannot retract our inadequate rating of the draft EIS based on the information you provided. We continue to believe the draft EIS should provide the water quality data necessary to demonstrate the proposed project can support the designated project purposes and that promotion of these project uses, through federal funding, will be in the public interest. The following concerns support our request that the EIS include the additional water quality data and the corresponding evaluation.

### Insecticides

Approximately one-half of the watershed (1544 acres) for the Stewart Creek reservoir has been and is now presently managed for intensive agricultural production. This land use has resulted in an intensive application of highly toxic/carcinogenic insecticides. The insecticides applied include the following:

|             |                                   |
|-------------|-----------------------------------|
| Endrin      | Methidathion                      |
| Parathion   | Imidan                            |
| Toxaphene   | Azinphosmethyl                    |
| Malathion   | Methoxychlor                      |
| Demeton     | Endosulfan                        |
| Carbofuran  | Trichlorfon                       |
| Lindane/BHC | Heptachlor                        |
| Chlordane   | PCB (used in pesticide synthesis) |

In addition, the following "persistent" pesticides were used until banned by our agency: Aldrin, Dieldrin and DDT. The amount of these compounds which enter the proposed recreation facility will directly affect the management and viability of the reservoir fishery. Also, the amount of these compounds which are concentrated in fish tissue directly relates to the hazards which may result from fish consumption by both man and other animal predators. The Environmental Protection Agency (EPA)

has developed recommended maximum concentrations of organochlorine and other pesticides which, for the protection of freshwater aquatic life and wildlife, should not be exceeded in whole (unfiltered) water (Water Quality Criteria 1972, March 1973). In addition, several of the aforementioned pesticides are additively or synergistically toxic when combined. This makes compliance with the recommended concentrations even more critical.

Several of the pesticides listed may be bound to soil particles and enter the proposed reservoir as a component of the suspended solids carried in the watershed runoff. Although concentrations of these pesticides may not be significantly high in the reservoir water, the presence of these compounds in reservoir sediments may result in bioaccumulation/concentration of these toxic substances. This process may result in acute or chronic toxic levels in predatory animals as well as fish tissue levels in excess of those considered safe for human consumption. EPA has developed recommended maximum levels for pesticide residuals in whole fish (wet weight) for the protection of predators (Water Quality Criteria 1972, March 1973). In addition, the U.S. Food and Drug Administration (FDA) has defined the acceptable levels for several of these pesticides in edible fish tissue.

Since one of the objectives of the proposed project is enhancement of area fishery, wildlife and recreation opportunities, the quality of the watershed runoff should be provided in the EIS. These data should be evaluated relative to both EPA and FDA pesticide criteria. If water quality data collected and evaluated indicate a significant problem may arise which would detract from the project objectives, appropriate measures should be taken to resolve the problem before project construction begins.

#### Domestic Waste

The City of Udall, Kansas is presently operating a three-cell lagoon sewage treatment facility in the Stewart Creek watershed above the site of the proposed multipurpose reservoir. Since this facility was constructed (approximately 1971), it has not operated properly due to leakage from the lagoons. This leakage has resulted in loss of the city's waste to the ground water and Stewart Creek. Although this operational problem relates directly to use of the proposed reservoir for whole body contact recreation it was not addressed in the EIS.

At the present time, only two lagoons are in operation and sewage is entering Stewart Creek by both leakage and direct discharge. The leakage from the lagoons travels underground and enters Stewart Creek as a point discharge a few hundred yards north of the lagoons. In a recent meeting with personnel from the City of Udall, we learned considerable

effort had been expended to repair the malfunctioning system. City officials believe the lagoons are located above a fault and they do not know if the lagoons can be properly sealed against this very significant leakage. Further repair measures appear beyond the city's economic capability and at this time, the City of Udall is not included on the Kansas state priority list for assistance with their waste treatment facility.

The city's waste, a significant source of pathogens, must be properly treated if the proposed reservoir is to support whole body contact recreation. It is essential that measures be taken to resolve this problem, relative to project objectives, prior to initiation of construction of the multipurpose reservoir. These measures may include:

1. Development of a no-discharge system. This solution is, at present, not within the capability of the city. In addition, it may not provide for the long-term needs of the growing community.
2. Develop a system for disinfection (chlorination) of city waste.
3. Adjustment of project purposes and objectives to reflect limitations resulting from present and predicted water quality.

#### Plant Nutrients

Page II-15 of the draft EIS indicates the average nutrient yield of nitrogen and phosphate are, respectively, 0.10 pounds and 0.05 pounds per cfs per square mile per year in the Walnut River Basin. This information, in addition to that provided in the table on page II-14, indicates the proposed multipurpose reservoir will be nutrient rich and probably subject to extensive algae growth. This concern should be related to the expected water quality of the proposed reservoir and its use as a recreational resource. Although algae growth does not generally present a public health problem, it does impact on the aesthetic appeal of the water body and on management of a viable sport fishery. The concern regarding management of the fishery may be intensified if copper sulfate is used to control algae growth since it is synergistically toxic with several of the pesticides being applied in the watershed. If it appears that a significant problem may exist, measures which may be implemented to resolve the concern should be identified and evaluated.

#### Animal Waste Contamination

Page II-15 of the draft EIS indicates five feedlots are located in the Middle Walnut Creek Watershed. However, no mention was made of the effect of these facilities on the proposed multi-use reservoir. This concern is significant since the Stewart Creek reservoir will be used for

whole body contact recreation. In our survey of the Stewart Creek watershed we observed considerable numbers of livestock. The majority of these animals were not confined to feedlots; however, there were several small feedlots (less than 50 head). As indicated in the Kansas Department of Health and Environment's (KDHE) letters of August 1, 1975 and February 25, 1976, to the Soil Conservation Service (SCS), violations of Class A water quality standards are expected to occur during periods of high surface runoff. In our February 23, 1976, meeting with SCS and KDHE, the KDHE personnel estimated two or three violations of the Class A water quality standards (lasting up to a week per violation) would occur during the recreation season. Although bacterial contamination from this source does not warrant the magnitude of concern associated with domestic sewage contamination, measures to resolve this source of pollution do warrant consideration since some animal pathogens effect man and animal wastes will provide a significant portion of the available plant nutrient load in the proposed reservoir.

#### Recommendations

The following are our recommendations for resolving our concerns with the adequacy of the EIS:

1. The EIS be expanded to provide the water quality data necessary to document that the project purposes can be realized.
2. If significant problems are identified, measures to resolve the problems should be identified prior to construction.
3. The City of Udall should take measures to correct the problems of their waste treatment facility. This includes placement on the state priority list and development of a feasible plan for correction. In addition, the treatment facility should be completed before the dam is closed and water is impounded.
4. Fish taken from Stewart Creek and surrounding bodies of water should be analyzed for pesticides and these data evaluated in the EIS. This information is necessary to document the claim that the proposed facility can provide a usable sport fishery as well as wildlife habitat.
5. If potential problems cannot be resolved relative to project objectives, the project should be adjusted to the water quality limitations.
6. Commitments to land use and management practices compatible with project purposes should be obtained from watershed landowners prior to project construction.
7. The State of Kansas should designate the reservoir as Class A before swimming is permitted.

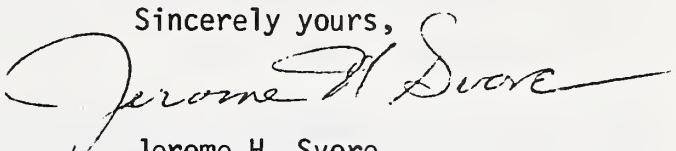
8. If pesticides continue to be used in the watershed, the sponsors/managers of the multipurpose reservoir should be required to conduct fish tissue analysis annually. If excessive tissue levels of pesticides are found, management of the facility for sport fishery and/or wildlife habitat should be terminated until levels can be reduced to safe levels.

9. If, through the periodic monitoring program, an unacceptable condition should be identified relative to public use of the proposed facility, the reservoir management should be committed to restrict the use of the facility until the condition has been resolved.

It is our belief that the aforementioned recommendations must be met before our "inadequate" rating of the draft EIS can be resolved.

If we can be of further assistance, please contact our office.

Sincerely yours,



Jerome H. Svore  
Regional Administrator

cc: Mr. Melville W. Gray, Director, Division of Environment, Kansas Dept. of Health and Environment, Topeka, Kansas 66620

Mr. Bill Greenwood, Pesticide Use Law Administrator, Kansas Dept. of Agriculture, State Office Building, Topeka, Kansas 66612

Mr. Richard Wettersten, Director, Kansas Forestry, Fish and Game Commission, Pratt, Kansas 67124

Mr. Gary Tiller, Mayor, City of Udall, Kansas 67146

Mr. Marion E. Strong, Director, Midwest Technical Service Center, SCS, Federal Building-U.S. Court House, Room 345, Lincoln, Neb. 68508

Mr. Paul Hamilton, Area Supervisor, Ecological Services, Fish and Wildlife Service, 601 East 12th Street, Kansas City, Mo. 64106

Mr. Lloyd R. Claiborne, Regional Food and Drug Director, U.S. Food and Drug Administration, 1009 Cherry, Kansas City, Mo. 64106

Mr. Russell W. Peterson, Chairman, Council on Environmental Quality, Executive Office of the President, 722 Jackson Place, N.W., Washington, D.C. 20002

# DEPARTMENT OF HEALTH AND ENVIRONMENT

DWIGHT F. METZLER, *Secretary*

Topeka, Kansas 66620

April 2, 1976

Mr. Robert K. Griffin  
State Conservationist  
Soil Conservation Service, U.S.D.A.  
Post Office Box 600  
Salina, Kansas 67401

Re: Environmental Impact Statement  
Middle Walnut Creek Watershed

Dear Mr. Griffin:

This letter is in response to the EPA letter to your office dated March 25, 1976 regarding the above watershed project. We wish to reaffirm our support for this Project as described in the draft EIS as being beneficial to the State of Kansas.

It is our opinion that the water quality data and information presented in your EIS and our letter of February 25, 1976 is entirely adequate to predict the reservoir water quality within the limits of the many, complex variables that interact within this hydrologic system. The specific factors for investigation as pointed out in the EPA letter were considered previously by our office in our analysis of the water quality at the proposed reservoir site. It was and is our opinion that none of these factors pose a threat to the proposed beneficial uses of this reservoir. We feel that any further refinement or accumulation of data would be an unnecessary planning expenditure and would not result in a more sound engineering or scientific judgement on a project of this scope.

We anticipate the opportunity of providing continued support of watershed projects in the future and hope that you will contact us at any time we can provide assistance.

Sincerely yours,

Division of Environment

*Gerald A. Stoltzenberg*

Gerald A. Stoltzenberg, P.E., Chief  
Water Quality Planning and Surveillance Section

GAS:nb

cc: Mr. J. Michael Nethery  
Mr. Keith Krause  
Mr. Jerome H. Svore

UNITED STATES DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

P. O. Box 600, Salina, Kansas 67401

April 8, 1976

Mr. Jerome H. Svore  
Regional Administrator  
Environmental Protection Agency  
1735 Baltimore  
Kansas City, Missouri 64108

Dear Mr. Svore:

Your letter of March 25 gives reasons for not changing your inadequate rating of the Middle Walnut Watershed Project draft environmental impact statement (EIS). We feel that the EIS is adequate and that water quality concerns were appropriately covered during the planning process. However, we do intend to be responsive to your comments before construction begins.

We propose the following actions regarding the nine recommendations in your letter:

Prior to construction of the multipurpose reservoir, the Soil Conservation Service (SCS) will take steps necessary to satisfy your agency that projected water quality will meet Class A standards, including a water quality monitoring program. Parameters to be monitored will be established by SCS in consultation with your office and the Kansas Department of Health and Environment (KDHE). If the data collected indicates a significant problem, appropriate measures will be taken prior to construction.

The City of Udall is anxious to correct the operational problem with their sewage lagoons. The SCS has offered to provide technical assistance to the city's engineering consultant. We have had considerable experience in successfully plugging gypsum solution channels in reservoirs using compacted clay materials. We believe this will provide an inexpensive and satisfactory solution in this case. This city will definitely correct their problem prior to construction of the reservoir.

Pesticide usage in the Stewart Creek drainage area is typical of wheat and grain sorghum producing dryland areas of south central Kansas. Past studies in dryland wheat producing



areas of Kansas indicate insecticide residues in fish tissue are relatively low compared with those reported from other parts of the nation. However, we intend to cooperate with the Kansas Forestry, Fish and Game Commission (KFFG) and the KDHE in testing for pesticide levels in fish tissue in this and other watersheds in the state. This item will be a subject of discussion at our May 10, 1976, meeting at the KDHE office in Topeka, Kansas. Your staff has been invited to participate in this meeting.

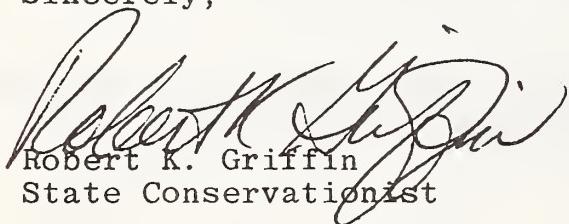
Regarding your recommendation that commitments be obtained from landowners above the multipurpose reservoir, we feel the voluntary land treatment program presented in the watershed plan will provide land use and management practices compatible with project purposes. At least seventy-five percent of each reservoir drainage area will be adequately protected as a prerequisite to project construction.

As stated in the Operation and Maintenance Section of the watershed plan, specific responsibility for monitoring water quality is being assumed by the City of Udall. Class A water quality standards will be met. In the event that temporary problems occur, the city will close the lake to recreational use. Such problems are expected to be infrequent and of short duration and will not interfere with realization of project benefits.

Enclosed is a zeroxed copy of the final watershed plan/EIS. We call your attention to the Consultation Section and to Appendix D containing the exchange of correspondence relating to EPA comments.

This project was authorized for planning in 1968. Numerous factors have contributed to delayed completion of this watershed plan. We feel further delay of the project is unwarranted; therefore, we are proceeding with necessary steps to complete planning. We hope you will agree that actions outlined in this letter satisfactorily address your concerns and hereby solicit reconsideration of your rating on this EIS.

Sincerely,

  
Robert K. Griffin  
State Conservationist

Enclosure

Advisory Council  
On Historic Preservation  
1522 K Street N.W.  
Washington, D.C. 20005

December 23, 1975

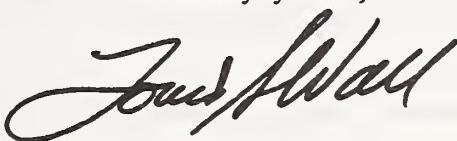
Mr. Robert K. Griffin  
State Conservationist  
Soil Conservation Service  
P. O. Box 600  
Salina, Kansas 67401

Dear Mr. Griffin:

This is in response to your request of December 4, 1975 for comments on the draft environmental statement (DES) for the Middle Walnut Watershed, Kansas. Pursuant to its responsibilities under Section 102(2)(C) of the National Environmental Policy Act of 1969, the Advisory Council on Historic Preservation has determined that this DES demonstrates evidence of compliance with Section 106 of the National Historic Preservation Act of 1966 but that it does not demonstrate compliance with the provisions of Executive Order 11593, "Protection and Enhancement of the Cultural Environment" of May 13, 1971. However, it appears that the Soil Conservation Service (SCS) recognizes its responsibilities pursuant to Executive Order 11593, and will carry them out in the future. Should this undertaking be authorized, the Council looks forward to working with SCS in accordance with the "Procedures for the Protection of Historic and Cultural Properties" (36 C.F.R. Part 800) as appropriate.

Should you have any questions or require any additional assistance, please contact Brit Allan Storey of the Advisory Council staff at P. O. Box 25085, Denver, Colorado 80225, telephone number (303) 234-4947.

Sincerely yours,



Louis S. Wall  
Assistant Director, Office  
of Review and Compliance

STATE OF KANSAS



OFFICE OF THE GOVERNOR  
State Capitol  
Topeka

March 1, 1976

ROBERT F. BENNETT  
Governor

Mr. Robert K. Griffin  
State Conservationist  
Soil Conservation Service  
P.O. Box 600  
Salina, Kansas 67401

Dear Mr. Griffin:

The Kansas Water Resources Board's staff has reviewed the watershed work plan and environmental impact statement prepared for the Middle Walnut Watershed Joint District No. 60. They advise that the proposed project is consistent with the Kansas State Water Plan and recommend that it be approved. I concur and request that the project be authorized and installed as rapidly as possible.

Sincerely,

A handwritten signature in black ink, appearing to read "Robert F. Bennett". Below the signature, the text "Governor of Kansas" is printed in a smaller font.

RFB:b

cc: Kansas Water Resources Board

Mr. E.E. Jabes, President  
Middle Walnut Watershed Joint  
District No. 60  
Route 1  
Box 58  
Derby, Kansas 67037

STATE OF KANSAS



DIVISION OF STATE PLANNING AND RESEARCH

1258-W State Office Building

Topeka, Kansas 66612

February 5, 1976

Robert K. Griffin  
State Conservationist  
U.S. Department of Agriculture  
Soil Conservation Service  
P.O. Box 600  
Salina, Kansas 67401

Re: Middle Walnut Watershed District  
Clearinghouse no. 2752-PL91-190 (ES)

Dear Mr. Griffin:

The referenced project has been processed by the Division of State Planning and Research under its clearinghouse responsibilities described in Circular A-95.

After review by interested state agencies, it has been found that the proposed project does not adversely affect state plans. Enclosed are comments concerning this project for your information and referral.

Sincerely,

A handwritten signature in cursive ink that reads "Walter H. Plosila".

Walter H. Plosila  
Assistant Director of Policy Research  
and Intergovernmental Relations

WHP:rb

enc.

State Clearinghouse  
State of Kansas

DIV. OF STATE  
PLANNING & RESEARCH  
ST. OFFICE BLDG.  
TOPEKA, KS. 66612

REQUEST FOR ACTION ON PROPOSAL (UNDER OFFICE OF MANAGEMENT AND BUDGET CIRCULAR A-95)

Agency Name

Kansas Board of Agriculture - Guy Gibson

Clearinghouse Number

2752 - PL91-190 (EIS)

Applicant's Name

Middle Walnut Watershed Joint Dist.

Expected Filing Date

Project Title

Environmental Impact Statement

RETURN NO LATER THAN

February 5, 1976

~~Return to Division of the Budget, Department of Administration, 1st Floor, Statehouse, Topeka, Kansas 66612~~

*Additional Info*

The enclosed proposal has been submitted to the Division of the Budget under its clearinghouse responsibilities described in Office of Management and Budget Circular A-95. Your review of this proposal as it affects the interest of the state will be appreciated. Your appropriate comments concerning the proposal should be submitted to the Division of the Budget no later than the date specified above.

Comments filed on a proposal may include: (1) the extent to which the project is consistent with or contributes to the fulfillment of comprehensive planning within the state; (2) how the proposal relates to state objectives; and (3) the effect of the proposal on your agency's activities.

No Objections

Request for Additional Information  
(discuss below)

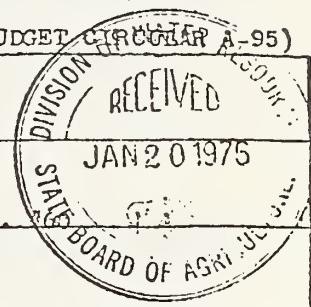
Objections  
(discuss below)

Request for a Conference

COMMENTS:

The fifteen dams proposed by Middle Walnut Watershed Joint District No. 60 would be subject to the provisions of K.S.A. 82a-301 to 305, requiring approval of plans and issuance of a permit by the Chief Engineer unless excepted by the provisions of Section 82a-304.

*Guy E. Gibson*



JAN 21 1976 RECEIVED

State Clearinghouse  
State of KansasDIV. OF STATE  
PLANNING & RESEARCH  
ST. OFFICE BLDG.  
TOPEKA, KS. 66612

## REQUEST FOR ACTION ON PROPOSAL (UNDER OFFICE OF MANAGEMENT AND BUDGET CIRCULAR A-95)

|  |   |
|--|---|
| Agency Name  |   |
| Kansas Forestry, Fish, & Game - Richard Wettersten |   |
| Clearinghouse Number                               | Applicant's Name  |
| 2752 - PL 91-190 (EIS)                             | Middle Walnut Watershed Joint Dist. #60   |
| Expected Filing Date                               | Project Title   |
| Environmental Impact Statement                     |   |
| RETURN NO LATER THAN                               | Return to Division of the Budget, Department of Administration, 1st Floor, Statehouse, Topeka, Kansas 66612 |
| February 5, 1976                                   |   |

*Additional Info*

The enclosed proposal has been submitted to the Division of the Budget under its clearinghouse responsibilities described in Office of Management and Budget Circular A-95. Your review of this proposal as it affects the interest of the state will be appreciated. Your appropriate comments concerning the proposal should be submitted to the Division of the Budget no later than the date specified above.

Comments filed on a proposal may include: (1) the extent to which the project is consistent with or contributes to the fulfillment of comprehensive planning within the state; (2) how the proposal relates to state objectives; and (3) the effect of the proposal on your agency's activities.

No Objections

Request for Additional Information  
(discuss below)

Objections  
(discuss below)

Request for a Conference

## COMMENTS:

Refer to enclosed Comments

"NO ADVERSE EFFECT"

*C. J. Wettersten*

DIRECTOR  
FOR FORESTRY, FISH, & GAME  
Signature

January 19, 1976

Mr. Robert K. Griffin  
State Conservationist  
SCS Office Box 600  
Salina, KS 67401

Dear Bob:

This responds to your December 4, 1975 request for review and comment, on the draft plan/EIS for Middle Walnut Watershed.

Sincerely,

Richard D. Wettersten  
Director

RDW:RTH/pj

Enc.

January 19, 1976

FORESTRY, FISH AND GAME COMMISSION COMMENTS ON  
MIDDLE WALNUT WATERSHED  
DRAFT ENVIRONMENTAL ASSESSMENT

Page II-33, para. 2, last sen.: Reword to state that habitat can be improved without economically competing with agricultural production.

Page II-41, para. 6: We would like to correct an earlier comment we made regarding improved aquatic habitat in the Walnut River and tributaries due to the impoundment system reducing turbidity. An impoundment system will reduce sedimentation, and thus improve habitat conditions, but the impact on turbidity is unknown. There exists a chance that the impoundments could increase turbidity in downstream areas as we have discussed before.

Page II-46, under Adverse Environmental Effects: We feel the statement relating to low flows below reservoirs during drought periods as stated on page II-56, paragraph 8 of a primary draft should be included in this and the final statement. The likelihood of occurrence of this effect is supported by earlier statements referring to the lack of seepage to be anticipated.

Page II-49, Alternative # 4: We reiterate our earlier comments on this alternative. Agricultural production would not necessarily be foregone on all 8,000 acres. Installation of "wildlife management" would permit continuation of cropping on lands not subject to scour if cropping would enhance wildlife habitat. Agricultural activities would be similar to our existing wildlife management areas on which share cropping would enhance wildlife habitat. Even on areas that were revegetated to stop scour, light grazing would be occasionally desirable to enhance habitat conditions. If the annual loss of agricultural production is included in the 11.7 million dollar cost, recalculation is needed in light of these comments.

# Kansas State Historical Society

10th AND JACKSON STREETS / TOPEKA, KANSAS 66612

PHONE (913) 296-3251

|                       |                              |
|-----------------------|------------------------------|
| NYLE H. MILLER        | Executive Director           |
| EDGAR LANGSDORF       | Deputy Director              |
| MRS. GEORGE T. HAWLEY | Librarian                    |
| ROBERT W. RICHMOND    | State Archivist              |
| STANLEY D. SOHL       | Museum Director              |
| THOMAS A. WITTY       | Archeologist                 |
| JOSEPH W. SNELL       | Curator, Manuscript Division |
| FORREST R. BLACKBURN  | Curator, Newspaper-Census    |
| RICHARD D. PANKRATZ   | Historic Sites Survey        |
| BLANCHE E. TAYLOR     | Office Manager               |



December 8, 1975

Mr. Robert K. Griffin  
State Conservationist  
Soil Conservation Service  
P. O. Box 600  
Salina, Kansas 67401

Dear Mr. Griffin:

We have reviewed the draft environmental impact statement for the Middle Walnut watershed in Butler, Cowley, Sedgwick and Sumner counties.

We note than an inventory has been made of the archeological resources in the affected areas and that a further assessment was to be made at Structure No. 4. Those additional findings should be included in the final EIS or made available for our review in some other form. The statement has satisfactorily dealt with those subjects within our purview, and we have no further comments at this time.

With kindest regards and best wishes, I am

Cordially,

*Nyle H. Miller*  
Executive Director and  
State Historic Preservation Officer

NHM:mg

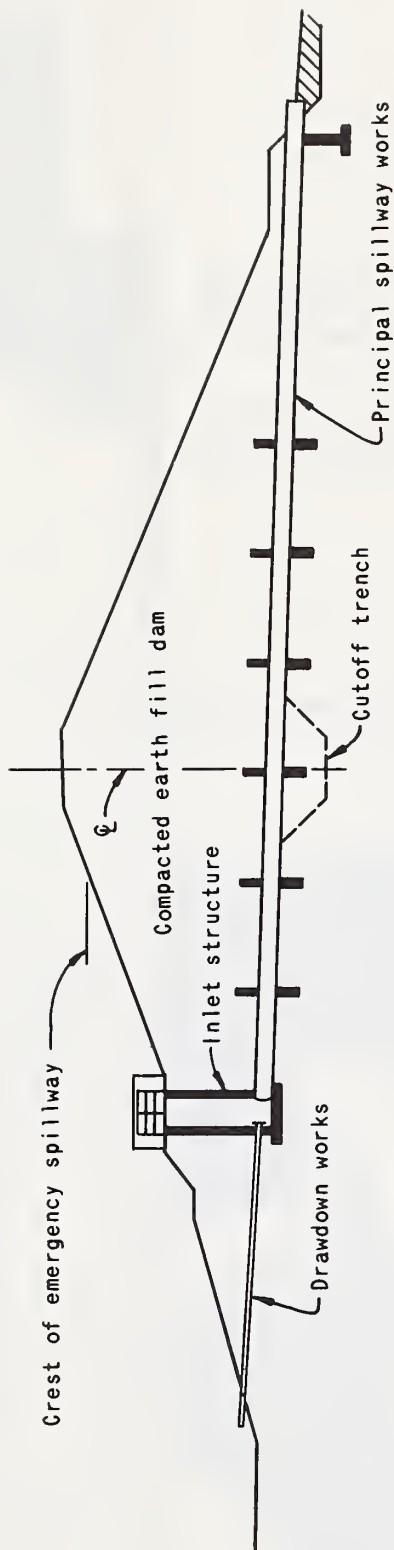
APPENDIX E

TYPICAL EARTH DAM WITH PIPE DROP INLET  
RECREATION DEVELOPMENT AND PROJECT MAPS



U. S. DEPARTMENT OF AGRICULTURE  
SOIL CONSERVATION SERVICE

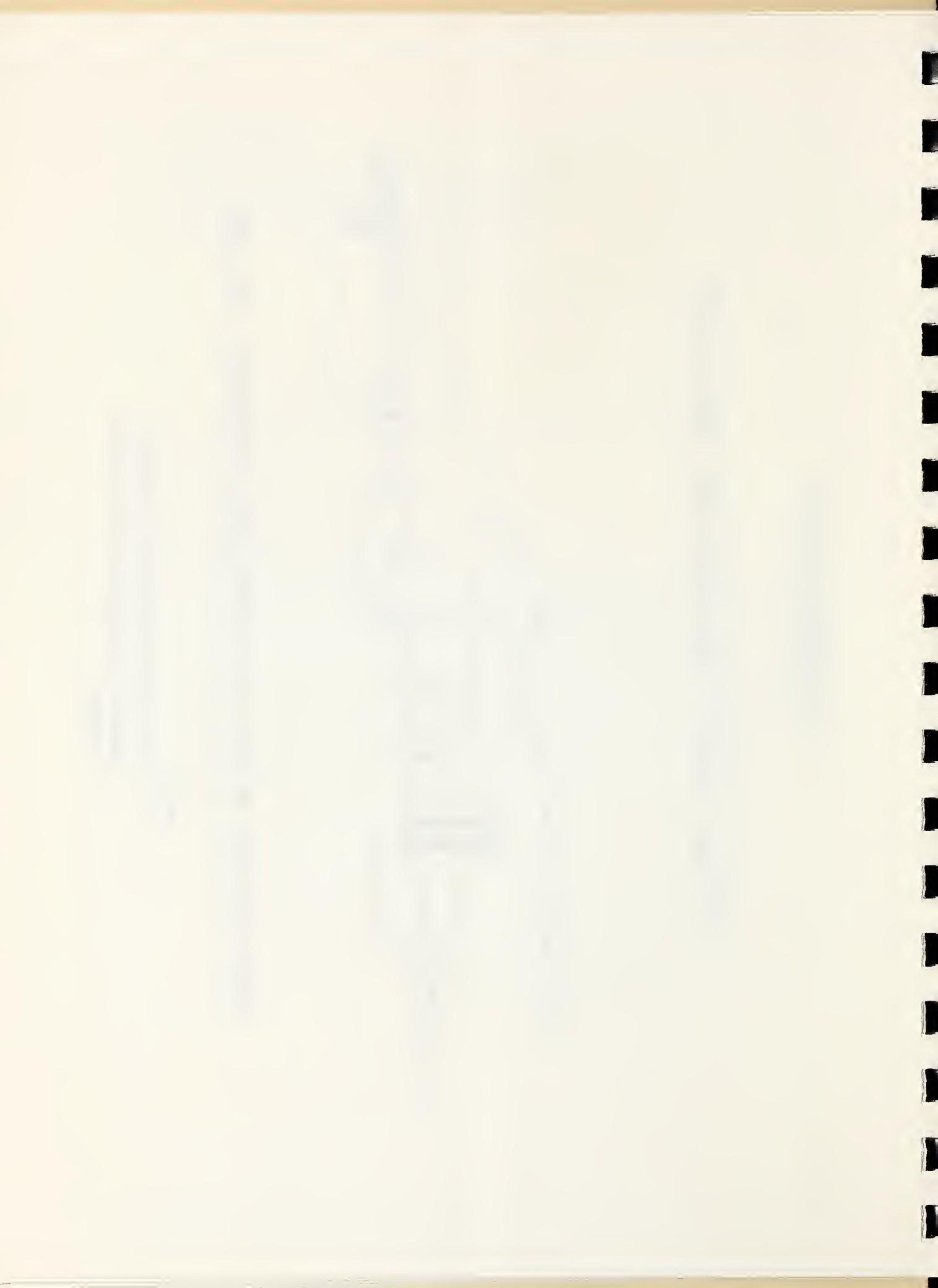
## TYPICAL EARTH DAM WITH PIPE DROP INLET



## CROSS SECTION OF DAM ON CENTERLINE OF PRINCIPAL SPILLWAY

### NOTES:

1. FOR INDIVIDUAL STRUCTURE DATA SEE TABLE 3.
2. EMBANKMENT AND FOUNDATION DESIGN FEATURES NOT SHOWN.





## WALNUT WATERSHED WICHITA, SEDGWICK & SUMNER COUNTIES

STRUCTURE NO. 4  
RECREATION DEVELOPMENT

KANSAS

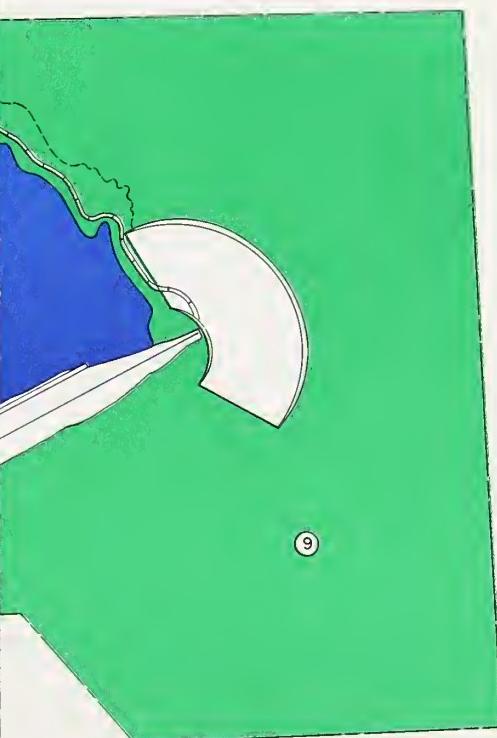


0 200 400 600 800 FEET



POPULATION CENTERS AND HIGHWAYS  
WITHIN 50 MILE RADIUS

SCALE 10 5 0 10 20 30 40 MILES



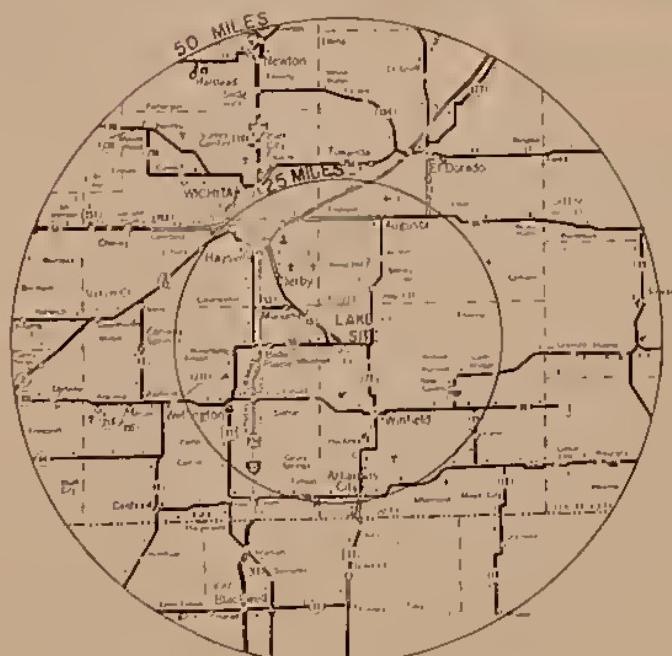


## MIDDLE WALNUT WATERSHED

BUTLER, COWLEY, SEDGWICK & SUMNER COUNTIES

STRUCTURE NO. 4  
PUBLIC RECREATION DEVELOPMENT

SCALE 200 .0 200 400 600 800 FEET



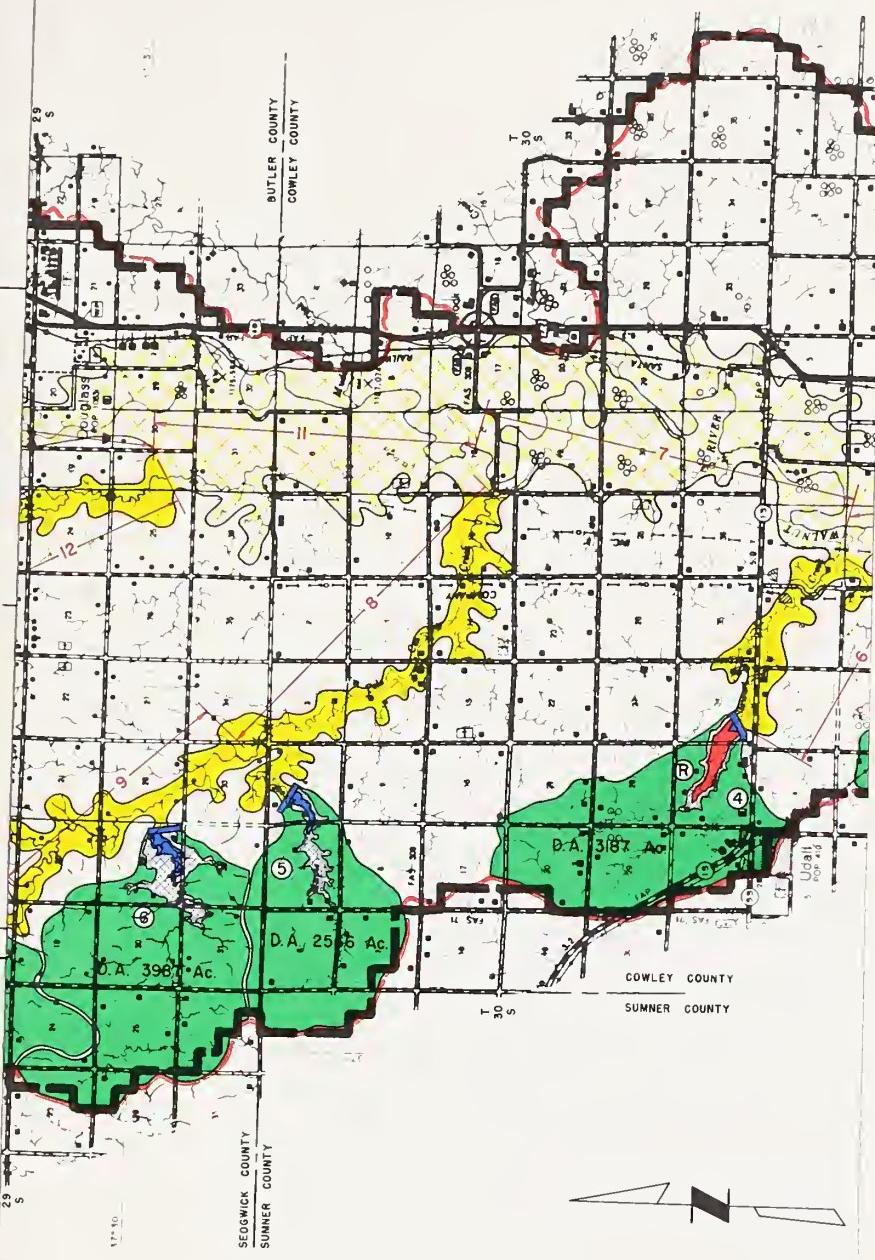
POPULATION CENTERS AND HIGHWAYS  
WITHIN 50 MILE RADIUS

SCALE 10 5 0 10 20 30 40 MILES

#### LEGEND

- (1) BOAT RAMP
  - (2) COMFORT STATION
  - (3) BOAT DOCK
  - (4) SEWAGE LAGOON
  - (5) CAMPGROUNDS
  - (6) SWIMMING BEACH
  - (7) NATURE TRAIL
  - (8) PICNIC AREA WITH PICNIC AND SANITARY FACILITIES
  - (9) WILDLIFE MANAGEMENT AREA
  - (10) PARKING AREA
  - (11) VAULT TOILET





BOUNDARY

BOUNDARY

TROLLED

N BENEFITED

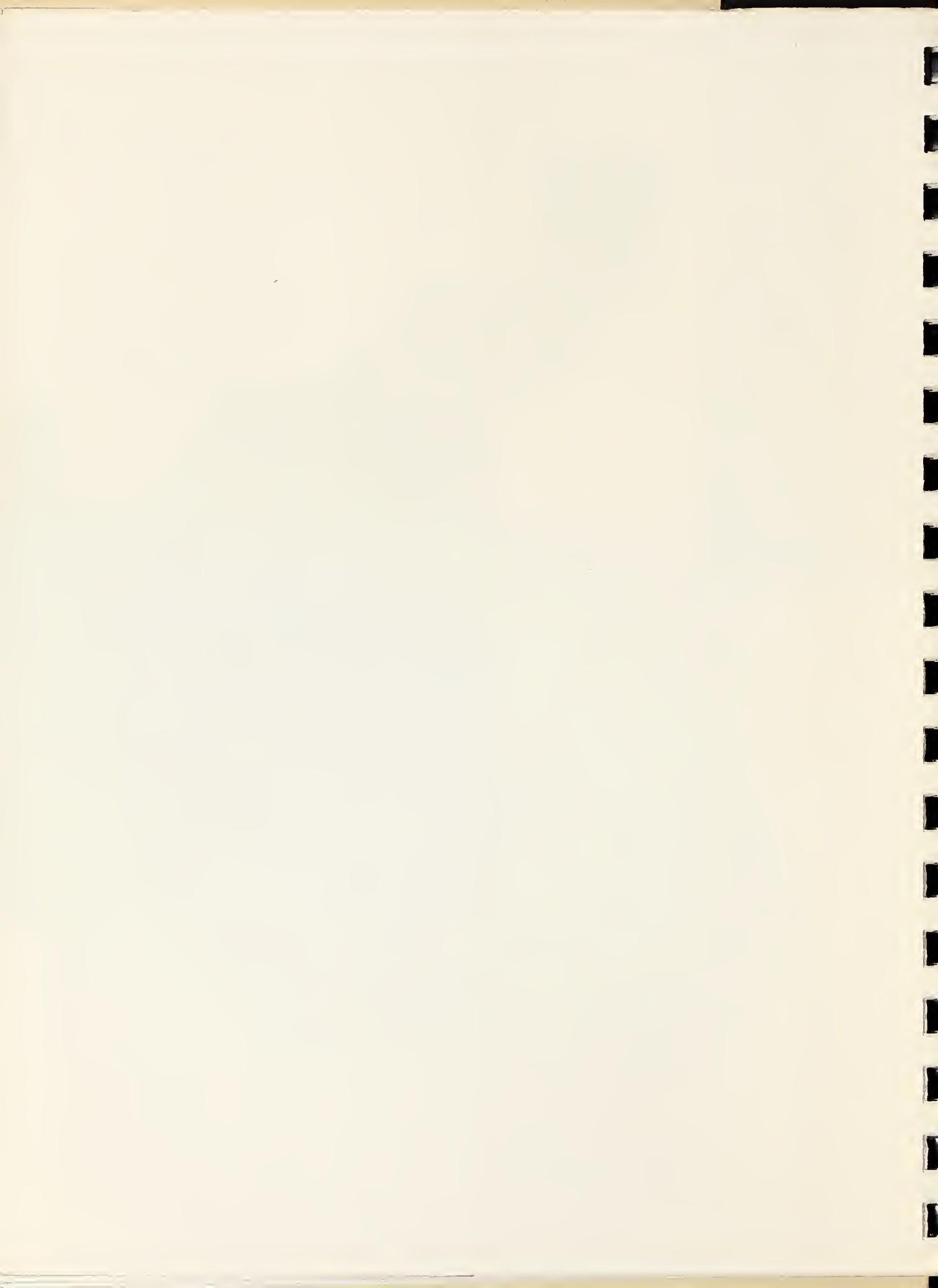
ING STRUCTURE

STRUCTURE

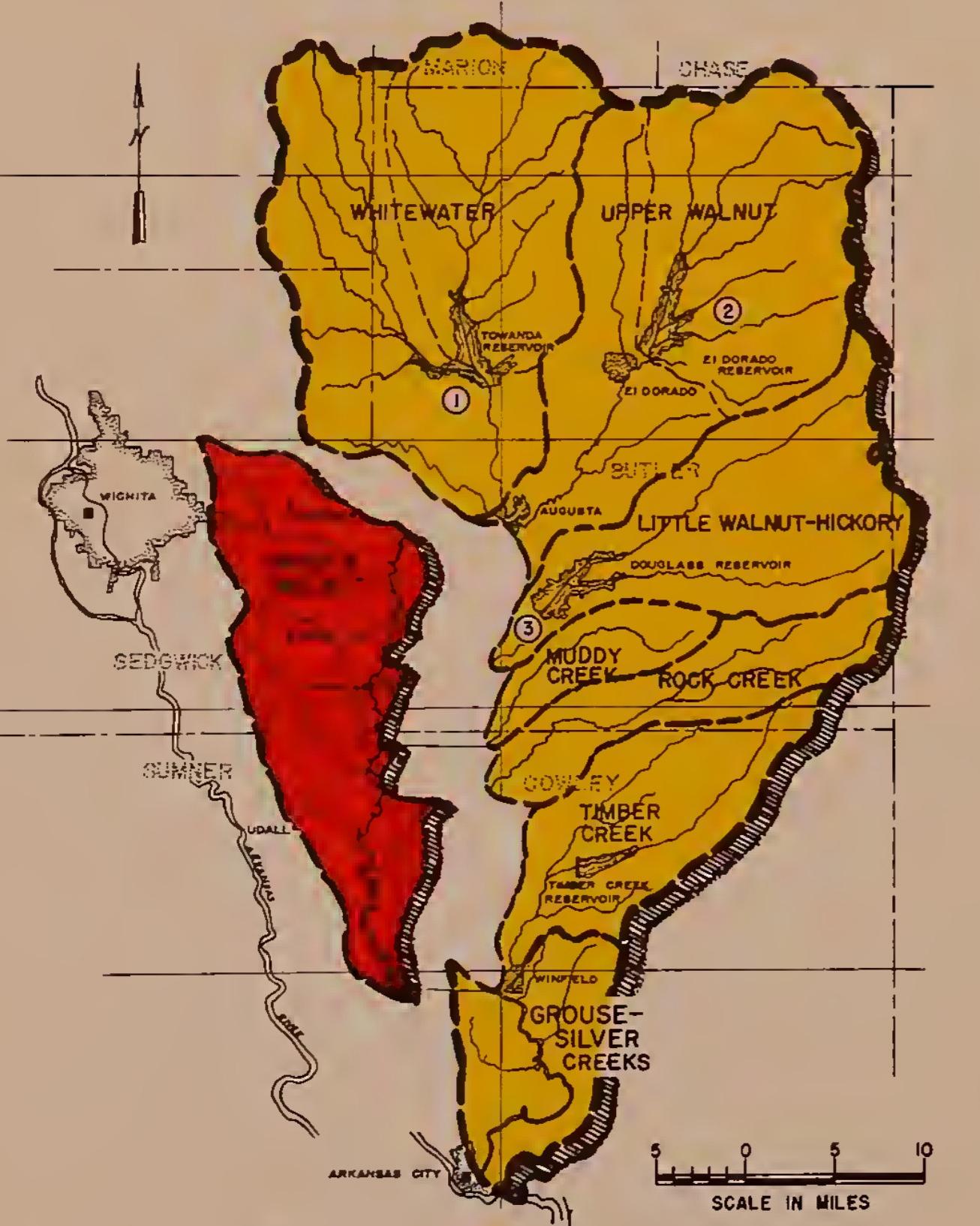
REAGE

SUPPLY (RECREATION)

Y AREA

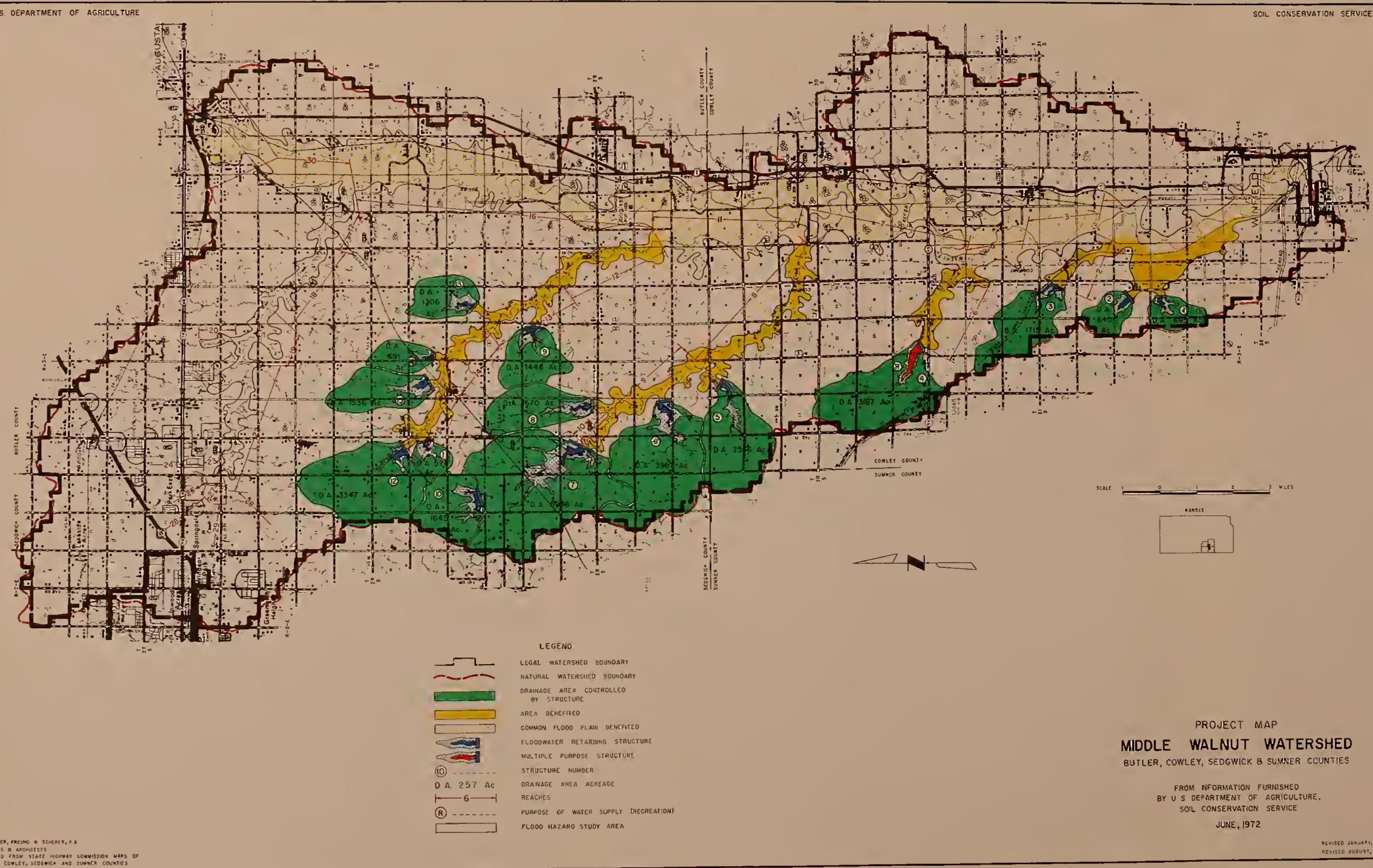


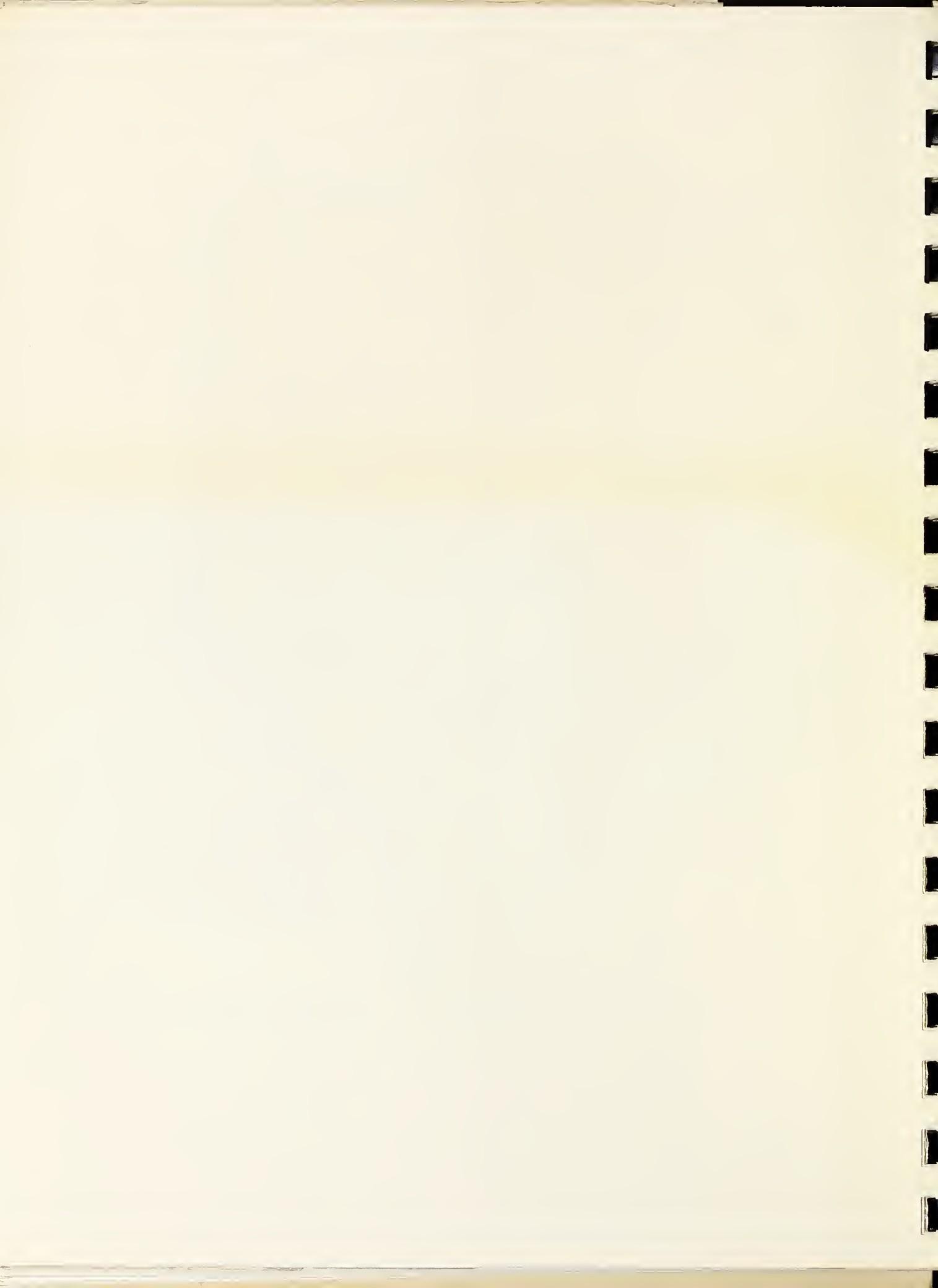
**WATERSHED PROJECTS LOCATION**  
**WALNUT RIVER BASIN**



- KEY**
- STATUS OF CORPS OF ENGINEERS RESERVOIRS**
- (1) TOWANDA RESERVOIR-AUTHORIZED
  - (2) EL DORADO RESERVOIR-UNDER CONSTR.
  - (3) DDUGLASS RESERVOIR-AUTHORIZED

- LEGEND**
- WALNUT RIVER WATERSHED BOUNDARY**
- PROJECT WATERSHED BOUNDARY**





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